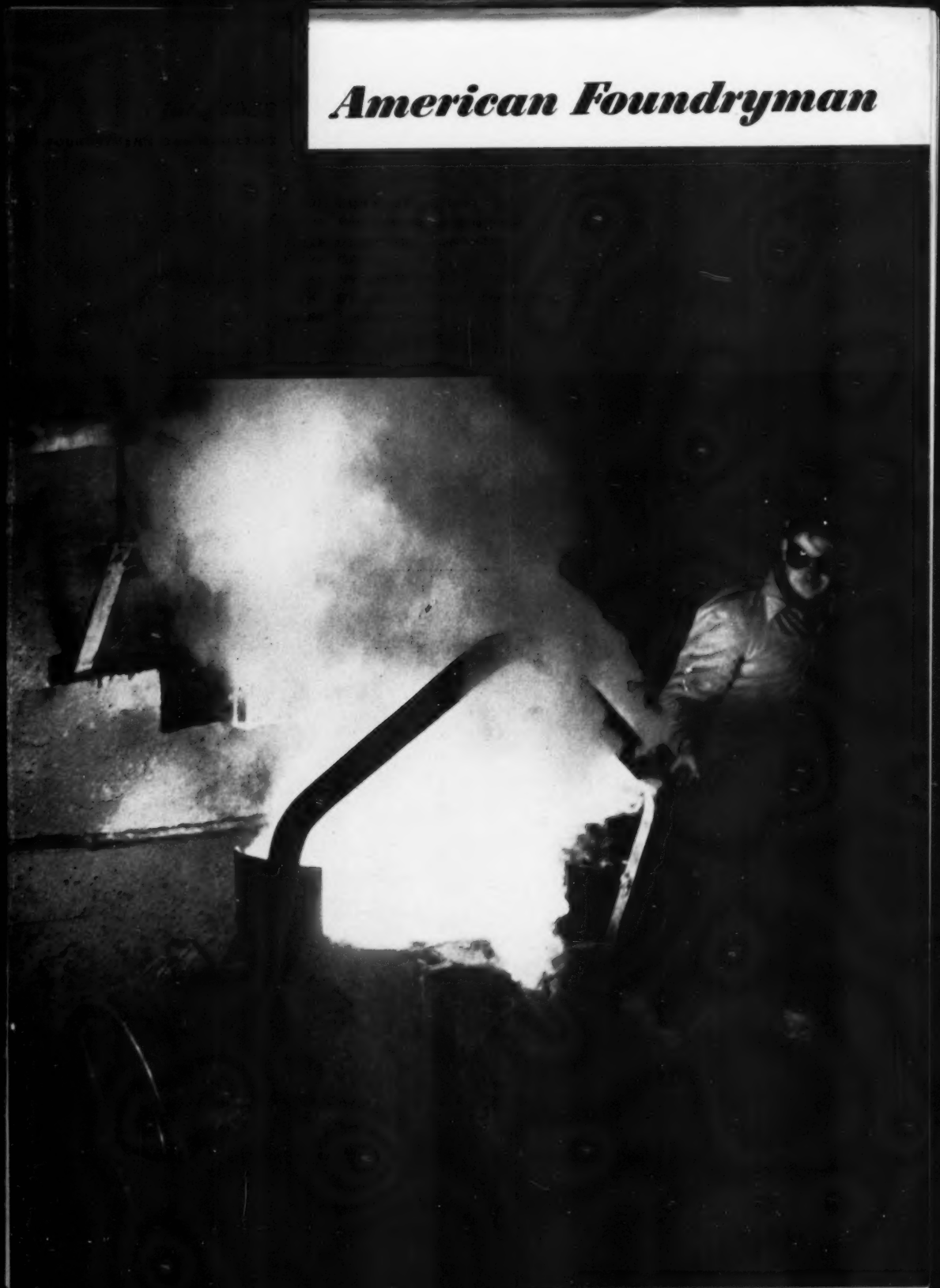
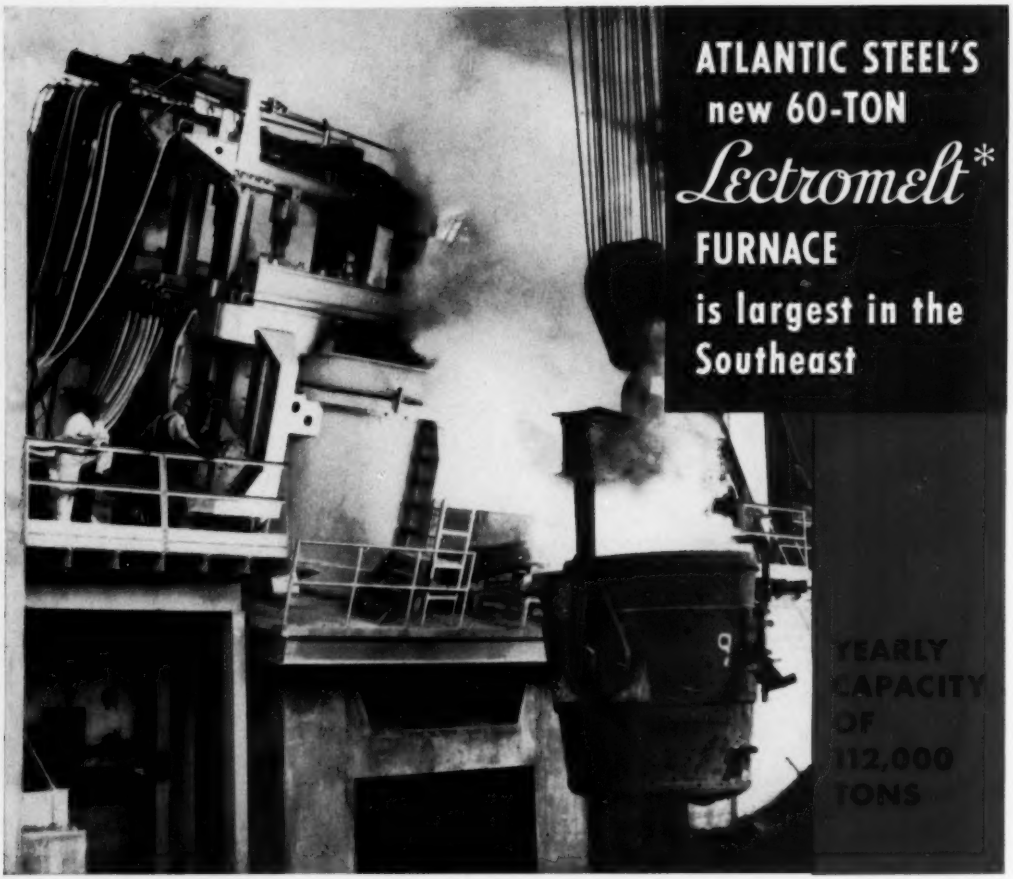
American Foundryman





W. E. Moore, inventor of the Moore Rapid Lectromelt* Furnace, was among the celebrities who witnessed the first official pouring of metal here at Atlantic Steel Company, Atlanta, Georgia. The furnace is this company's first electric furnace, and the largest of its kind in the Southeast.

The "JT" Lectromelt Furnace has an 18-foot shell diameter, is rated at 60 tons, but is capable of producing 75 tons of steel ingots per-heat. It has timesaving and laborsaving top-charging.

If you're interested in furnaces for melting, refining, smelting or reduction, write for Catalog No. 8, Pittsburgh Lectromelt Furnace Corporation, 316 32nd Street, Pittsburgh 30, Pennsylvania.

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*REG. T. M. U. S. PAT. OFF.

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CROWN HILL MEANS *Quality* SEACOAL

CROWN HILL SEACOAL FACING
100 LBS.
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FIGURES FROM BUREAU OF MINES, DEPT. OF INTERIOR OF THE U. S.

(Moisture Free)

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Volatile Matter	38.9%
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	100.0%

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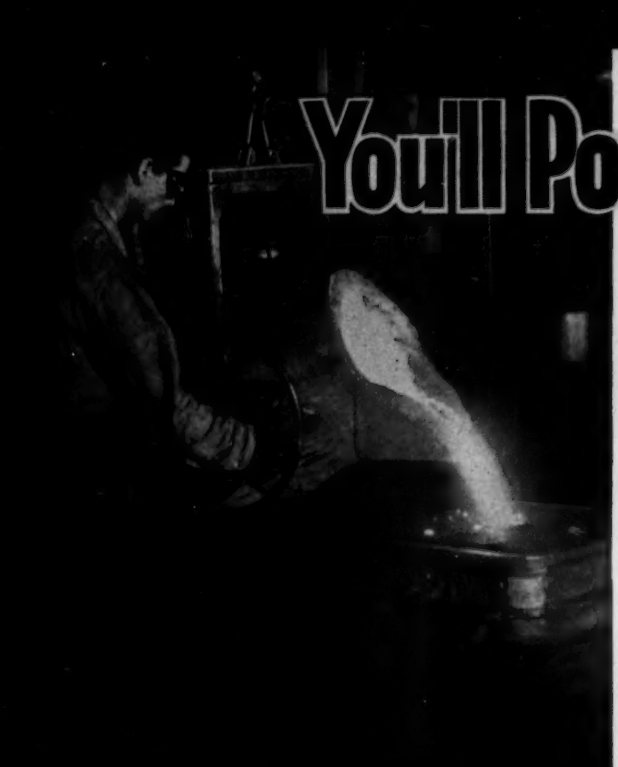

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WHEN YOUR ENGINEERING
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STANDARDS
PLUS
SPECIALS

Pouring-off methods may account for the difference between getting a new contract for castings and being under-bid by as little as a half cent a pound. It's these small differences that so often weigh up heavily at the pay scale.

Differing mold heights... shifting sprue holes... distribution techniques... temperatures of metal poured... safety features and fatigue factors are but a few of the differences that can make or break pouring costs. Striking the right balance for foundry executives is our business.

WORKING TOGETHER with practical foundrymen for more than thirty years MODERN engineers have acquired much KNOW HOW in the blending of specials to enhance old standards. We shall be happy to check your problem forward and back. If your immediate problem cannot be stated on the coupon write it on your company letterhead.

SPECIAL: *One of the nation's foremost builders* of agricultural machinery required the long-reach, low-headroom, special type of ladle shown above. This ladle has a 19" top, 15" bottom and 30" depth. It met the special need.*

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Without cost or obligation mail:

Catalog on metal pouring systems		☐
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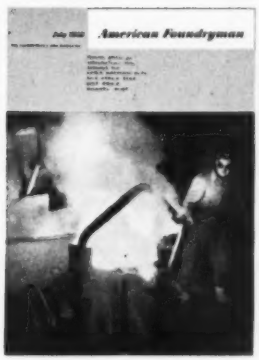
American Foundryman

July 1952 / *Volume 22 • Number 1*

Official Publication of the American Foundrymen's Society



Inoculating nodular iron with a nickel-magnesium alloy produced this pyrotechnic display in the Mahwah (N.J.) Plant of American Brake Shoe Co. Now taking its place as another cast metal for designers and manufacturers to use, nodular or spheroidal graphite cast iron was introduced to America at the 1948 A.F.S. Convention in Philadelphia as a material produced by cerium inoculation. Processes in which magnesium, calcium, and zirconium are the active inoculants also have been developed.

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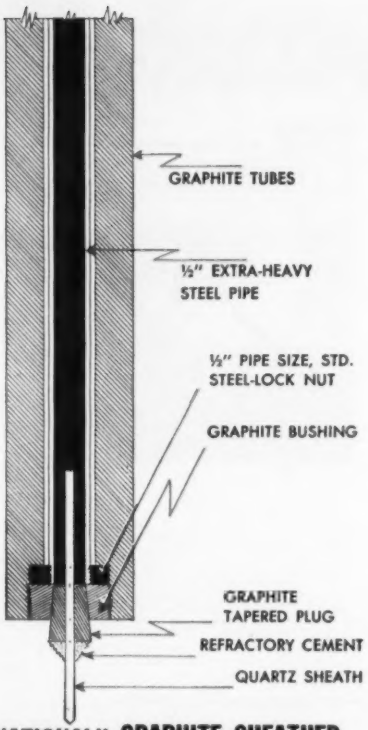

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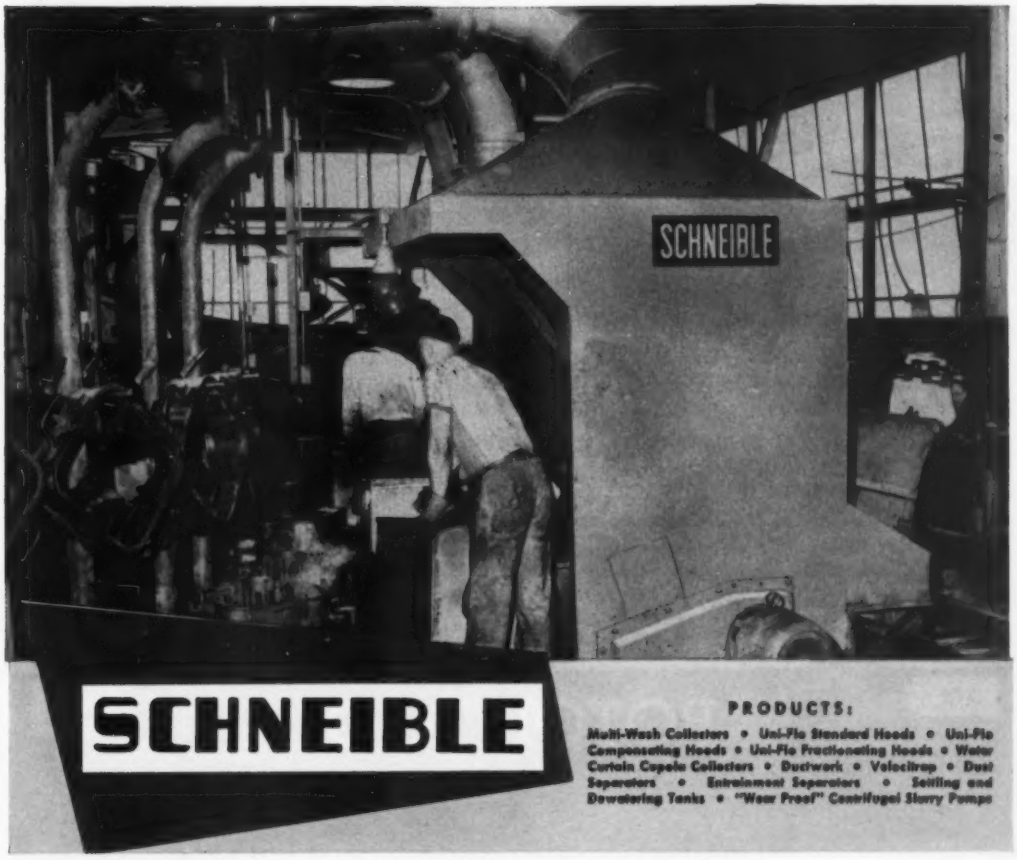

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RESULTS: Cut rejects. More output per day "paid off" new Rotor Chipper in 29 days.

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THE CLEVELAND OHIO

SPECIALISTS OF PORTABLE TOOL PROBLEMS

VOLCLAY BENTONITE

NEWS LETTER No. 28

REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

Pressures in Molds

The pressures produced by any liquid metal in a mold cavity are transmitted in all directions and act perpendicularly to the mold surfaces.

The molding sand must be rammed properly to resist these pressures caused by the liquid metal against the mold. The molding mixture must have sufficient flowability to form a rigid and compact surface to resist this action.

If the mold-metal interface moves during the pouring operation, castings may be oversized and overweight and may produce "APPARENT SHRINKS".

The magnitude of the static pressure on any area of the mold surface is directly proportional to the head pressure of liquid metal above that area.

Since the weight of one cubic inch of cast iron is 0.26 pounds, the pressure in pounds per square inch is equivalent to the head of metal in inches at that point multiplied by 0.26. For steel this factor is greater.

The static pressure exerted on the cope section of the mold is equivalent to the height in inches of the metal in the sprue multiplied by the area in square inches of the cope surface which is exposed to the metal, and then again multiplied by the factor 0.26. **The sprue height is important in proper gating practices** as can be recognized by the above formula.

It is also necessary to account for the additional pressure on the cope surface caused by the momentum of the metal as it fills the mold cavity.

The maximum pressure on the cope may be considered as equivalent to two times the static pressure.

The cope may be of sufficient weight to resist the pressure which is developed within the mold cavity; however, it is usually necessary to place additional weight on the mold, or to make certain that the mold is clamped tightly before pouring. **The total pressure exerted on the inside surface of the cope of a mold may be determined** by multiplying the average pressure on the surface by the area of the vertical projection of the cope in contact with the metal.

Flask equipment should certainly be strong enough to overcome any lateral pressure developed within the mold.

Panther Creek Bentonite furnishes high flowability and rams to a safe degree of hardness, thus insuring a minimum amount of movement in a green sand mold mixture and is definitely on the preferred list of foundry materials to resist these pressures for better casting results.

AMERICAN COLLOID COMPANY

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shell molding

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Here you'll find helpful information about this money-saving process . . . about resin-sand mixtures for making thin shell molds . . . pattern preparation . . . mold curing . . . pouring.

These lightweight shell molds yield almost pattern-smooth castings. Tolerances are as close as .003 to .005 inches per inch. Castings are so smooth that finishing is cut to a minimum.

This booklet covers the process in a clear, factual manner. Actual photographs illustrate the steps from preparation of the resin-sand mixture to removal of the finished casting.

To learn more about the shell molding process, write for your free copy. Mail the coupon today.

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TRADE-MARK
PHENOLIC RESINS

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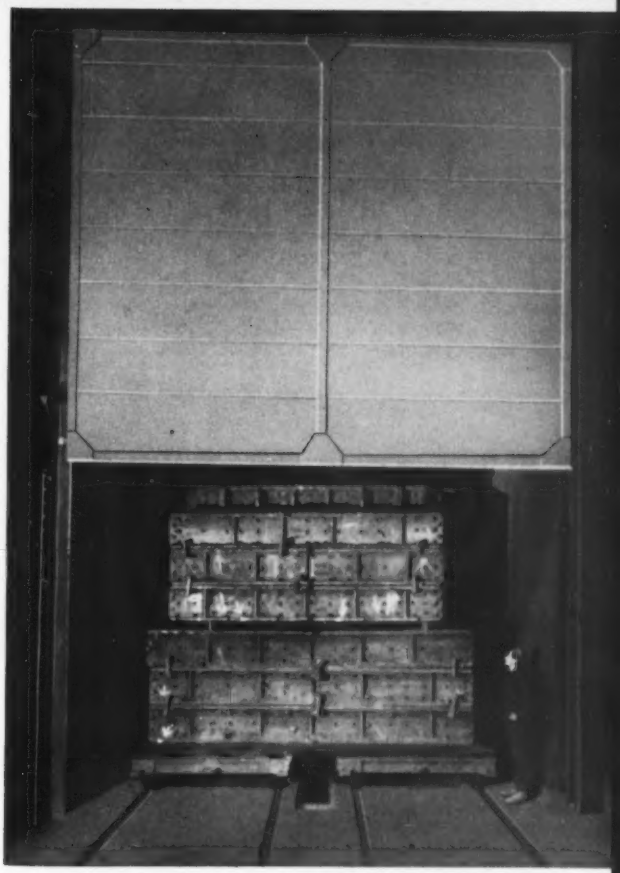

CARL-MAYER MOLD OVEN at Union Steel Castings Div. of Blaw-Knox Co. Door Clearance: 17'9" wide, 15' high. Depth: 40'. Capacity: 200 tons per bake. Combination Gas-Oil fired.

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Bringing Together

PRINCIPLES, STANDARDS, FACTS AND TABLES PERTAINING TO

SAND Control

A casting is only as good as the mold!

A foundryman may select his metal with the greatest of care. His melting procedure may be in accordance with recommended practice. And he may exercise full control over his pouring temperatures and pouring methods. BUT . . . he cannot consistently produce quality castings in molds prepared from uncontrolled sand mixtures.

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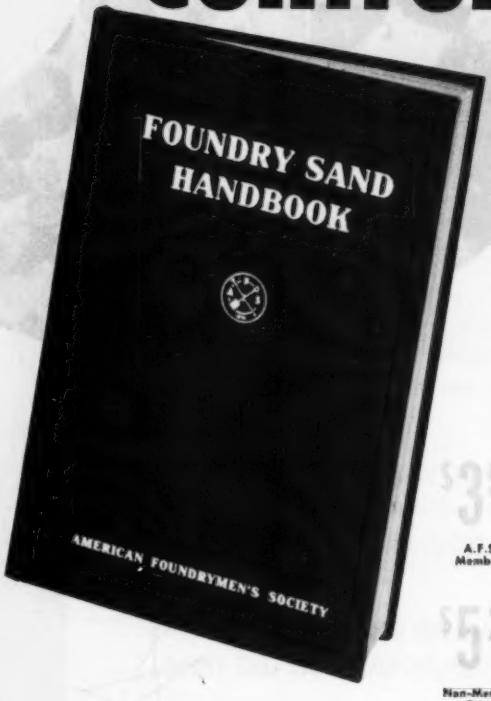

Contents include:

Methods for Sampling Foundry Sands and Clays
Preparing Foundry Sand Mixtures for Testing
Methods for Determining Fineness of Foundry Sands—Standard
Determining Moisture in Foundry Sand Mixtures—Standard
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Interpretation of Room Temperature Sand Tests
Comments on Maintenance of Testing Equipment
Foundry Molding Sand Mixtures
Conversion Tables
Terms Used in Foundry Sand Work
Bibliography on Sand Testing and Control
Subject Index

265 pages . . . 23 separate sections . . . 93 illustrations . . . 13 tables . . . add to the completeness of this 6th edition of the cloth-bound A.F.S. FOUNDRY SAND HANDBOOK.

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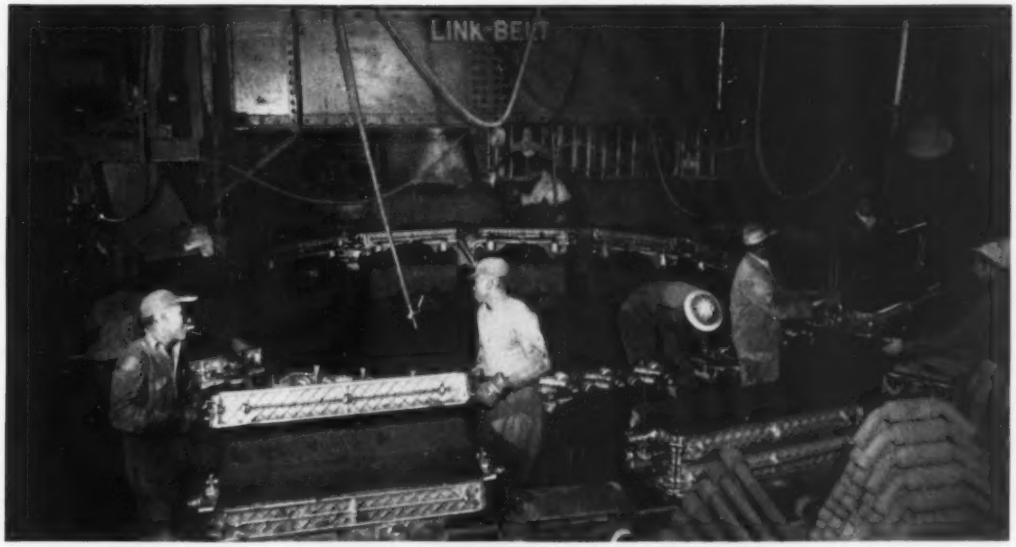
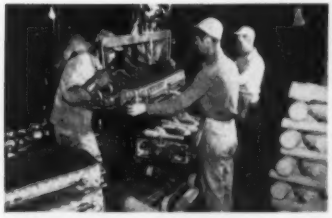
LINK-BELT helps Central Foundry step up production



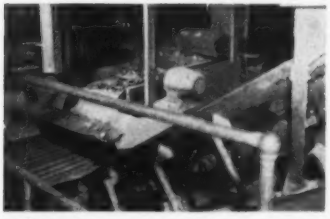
1 Mechanization by Link-Belt at Central Foundry Co., Holt, Alabama, has resulted in increased production and better working conditions. Continuously moving Tru-Trac mold conveyor, above, is 110 ft. long.



2 After cores have been set, molds are closed. Tru-Trac Conveyor continues to pouring station, thence through cooling zone to central shakeout point.

3 Twin UP Vibrating Screens over the storage bin receive sand from elevator and shakeout via belt conveyor. Large sand capacity necessitates dual installation.

4 Uniform and proper sand conditioning is continuously obtained at Central Foundry. Two muller type mixers shown here prepare and cool the sand.



5 Tilting top trays discharge molds to shakeout. Castings go over end of shakeout screen to apron conveyor. Complete mold, sand and castings handling equipment was designed, built and installed by Link-Belt.

If you have a mechanization or sand preparation problem in your foundry, a Link-Belt foundry engineer will be glad to discuss it with you or your consultants. For complete information, call the Link-Belt office near you.

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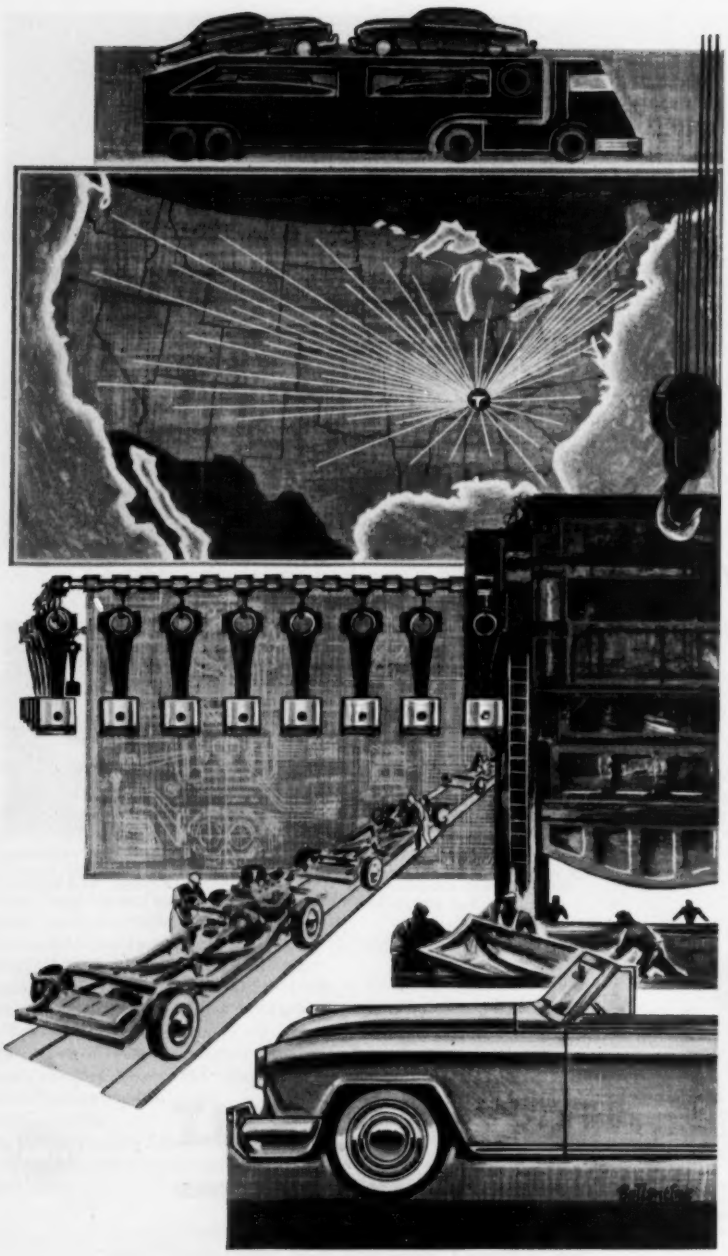
CONVEYORS and PREPARATION MACHINERY

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities. 12,828

THERE'S A TOUCH OF TENNESSEE IN MICHIGAN AUTOMOBILES



Michigan makes more automobiles than all the rest of the world. These vast plants which have taught the world the meaning of mass production use many products from TENNESSEE . . . pig iron and ferro alloys for castings and sheet steel, Plasticizers for plastics, Methanol for paint solvents used in lacquered finishes, and many more.

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UNIVERSAL ENGINEERING COMPANY

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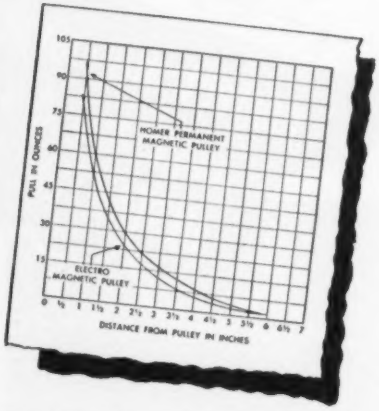
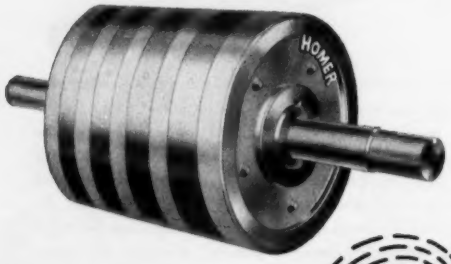
After you have made a thorough check of all conditions, we believe you will find that by comparison—Homers are proved best and most economical for top performance, long life and uninterrupted service.

Remember—if Homer recommends an installation for you . . . Homer will guarantee its recommendation.



The above heavy-duty performance curves were plotted from tests executed by our own engineering staff and by an outside testing laboratory. Literature, recommendations and estimates for the asking.



MAGNETIC PLATES
MAGNETIC PULLEYS
MAGNETIC DRUMS

HOMER

MAGNETIC TRAPS
MAGNETIC DUCTS
MAGNETIC SWEEPERS

THE HOMER MANUFACTURING CO. INC., DEPT. 249, LIMA, OHIO, U. S. A.

PRODUCERS OF MAGNETIC SEPARATOR EQUIPMENT SINCE 1923

for lower cost ladle graphitizing
for effective chill reduction
for accurate hardness control
for better machinability

SPECIFY

No.8®

The most powerful ladle graphitizer

Proven in use by thousands of foundries

Treat gray iron effectively for less than 10 cents per ton of castings! One ounce per 100 lbs. of iron will usually do the job.

WRITE FOR OUR
ENGINEERING BULLETIN NO. 2

GRAPHITIZE WITH No. 8

170

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

LOWERS MELTING COST PER POUND!

LENGTHENS CRUCIBLE, LINING LIFE!

HY-TEMP REFRACTO

INDUCTION FURNACE RAM MIX

PAT. NO. 2165788

197 HEATS

...and only 6 patches

Here's record high frequency induction furnace performance resulting from outstanding refractory stamina . . .

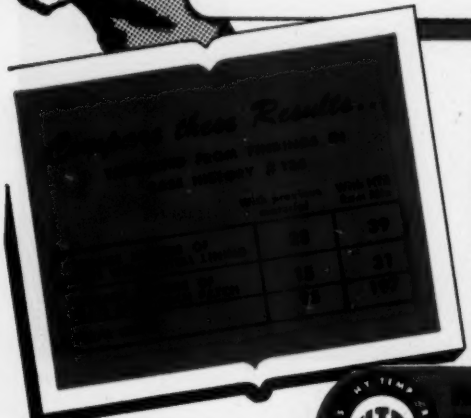
BEATS THE TOUGHEST MELTING JOBS!

CASE HISTORY #134

A producer of steel castings, melting with 1,000 lb. high-frequency furnaces . . . 800 to 900 cycle . . . averaged about 95 heats with his melting equipment before it became necessary to reline.

600 lbs. of material, rammed between the coils and a wooden center plug, was needed to give a wall thickness of about 2½". The furnace normally ran for about 28 heats before patching was required. Subsequently, by intermediate patching, the total of 95 heats was reached.

HY TEMP REFRACTO Induction Furnace Ram Mix was then tried in an effort to obtain more heats per lining. The initial lining ran 39 heats before patching was required. Subsequent patching gave a total of 197 heats.



The above case illustrates one of many instances of HTR Ram Mix superiority. Whether the high-frequency induction furnace produces alloy or plain carbon steels . . . be it operated with a separate crucible or with a coil lining . . . HTR materials will improve its production capacity and help lower maintenance costs.

HTR Induction Furnace Ram Mix, because of its ability to resist high temperature stress, permits thinner linings and increased melting area diameter . . . reduces "patch" interruption frequency, thereby lengthening heat-runs to the greatest possible extent. The characteristics of low shrinkage . . . excellent workability . . . exceptional slag erosion-resistance . . . make HTR Ram Mix the logical first choice for high-frequency induction furnace linings and crucibles. Yes, it pays to specify HTR . . . for best results by far!

Call on us for further information on HTR REFRACTORY MATERIALS, formulated for all metals melting purposes. HTR Service Engineers will be glad to advise you competently on your problems . . . without obligation to you.

HTR — HY TEMP REFRACTO

NATIONAL FOUNDRY SAND CO.

• BONDING CEMENTS • ELECTRIC FURNACE LININGS AND BOTTOMS

EXECUTIVE OFFICES [illegible] WEST GRAND BLVD., DETROIT, MICHIGAN

products and processes

For additional information, use postcard at bottom of this page

701 Rust removing compound

Rustclean is a chemical compound that removes rust, tarnish, and light oil; prepares metals for painting; and retards corrosion. Besides chemically cleaning surfaces of steel, iron, aluminum, zinc, and cadmium, it forms a phosphate film which acts as a base for organic finishes. It is also an effective tarnish remover for copper and its alloys. Several types are available, each designed for different work. Rustclean is safe to use, lacking the corrosive action of strong pickling compounds. It doesn't fume or emit toxic vapors, and can be used in the same area as steel. *Octagon Process Inc.*

702 Bin level indicator

Designed for suspended installation, Model CS Bin-Dicator can be located anywhere in the bin where there is a free flow of material around the diaphragm. It gives dependable level indications in bins containing materials which tend to build up on the walls and flow down through the central area only. Unit is designed to be drilled and tapped to take any size pipe up to 2 in. Support pipe also accommodates wiring, making conas steel. *Octagon Process Inc.*

703 Belt polisher

Small parts can be ground, finished, polished, and deburred off-hand on the Model UM-60 universal grinder. Employing the contact wheel method of coated abrasive belt polishing, this unit features platen-supported belt grinding, concave and convex contour grinding and polishing, and ¼ to ½-in. radius grinding. Internal attachments are capable of handling areas from ⅝ in. to 2 in. inside diameter. Mounted on a fabricated steel cabinet base, the grinder can be rotated 360 degrees, with automatic locking at every 90 degrees. It has three standard positions of operation—vertical, horizontal, and perpendicular—making it adaptable to any type of off-hand operation without wasting production floor space. *George F. Grant Co., Inc.*

704 Crane cab cooler

Completing the Dravo line of crane cab air conditioning and ventilating is the Model C-3SP, a split-type cooler in the 3-hp size. Line now includes horizontal, vertical, self-contained, and split-type units of 3, 5, and 7½ hp. The new model will maintain a temperature of 80 to 85 F within a crane cab when the ambient temperature reaches 130 F. Supplying continuous ventilation, this unit is equipped with electric strip heaters for winter, dust and dirt filters, and activated carbon canisters for fume and odor removal. Operation and control for temperatures is fully automatic. The compact evaporator section can be installed inside the cab, while the condenser section may be located in any convenient place on the crane. The two sections are connected by refrigerant piping. *Dravo Corp.*

705 Vacuum impregnation

Castings can be made pressure-proof by impregnation with sodium silicate or other heat-resistant material. Particularly effective on brass, bronze, aluminum, magnesium, and other light metals, this vacuum treatment has no effect on machining or metallurgical characteristics. Usefulness is limited to capillary defects; it is not recommended for visible porosities which permit spurting under hydraulic pressure. It will, however, prevent "leakers" or "weepers." *F. J. Stokes Machine Co.*

706 Mobile shower bath

Four men can load this emergency shower onto a truck and take it where it is needed. Only requirement is a source of water. Shower is invaluable in putting out fires and diluting acids, chemicals, and other foreign materials. Thorough wetting is supplied by 4 overhead sprays, 2 special sprays for eyes and face, 4 bottom sprays that squirt the water up under smocks or coats, and 4 sprays for the feet. Shower can be entered from either of 2 sides. Valve for turning on water is activated by a swinging gate, remains open until manually turned off. *Logan Emergency Showers, Inc.*

707 Metal pre-treatment

Jenolite will derust, desmale, phosphate, rust-proof, and key metal surfaces for paint adhesion in one operation. It can be applied by dipping, spraying, or brushing. Components treated with this material will not re-oxidize for a considerable length of time. Perfect paint adhesion is assured. *Eastern Jenolite Distributing Co.*

708 Dust bag fabrics

Designed specifically for dry separation equipment and dust collectors, two new Orlon weaves, Feon 425 and 426, are espe-

continued on page 82

Reader Service Dept.

52|7

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713 Save aluminum

Eight-page booklet, "Conservation of Aluminum", contains information on efficient use of available supplies of this metal as well as on proper handling of scrap. *The Aluminum Association.*

714 Cold metal treatment

Advantages of and equipment for low-temperature metal treatment are presented in the 8-page bulletin, "Put Sub-Zero to Work." Among the processes covered are chilling for stabilization of steel, increasing perishable tool life, and shrink-fit assembly. Through repeated cycles of heat and sub-zero chilling, complete stabilization of steel can be attained in a few hours. Perishable tools show gains up to 1700 per cent usable life. In shrink-fit assembly, remarkable savings in time and prevention of spoilage of parts are reported. Bulletin also contains two pages of technical data on methods and results on various metals and alloys. *Sub-Zero Products Mfg. Div., Deepfreeze Distributing Corp.*

715 Floor topping

Completely illustrated 20-page bulletin "Traffic Concrete" details the advantages of Dynapakt concrete floor topping in terms of materials used and methods of installation. A step-by-step comparison of low water ratio methods as opposed to wet mixes is included. *Flash-Stone Co.*

716 Refractories

"Refractories and Insulation", a 4-page 2-color bulletin, gives brief details on a complete line of these products. Included are a high-temperature vermiculite insulation available in block, brick, coating, granules, and concrete; two types of chemically bonded refractory brick; and fire clay brick, fire clay flour, tap hole mix, and ground fire clay. *Illinois Clay Products Co.*

717 Oxygen operation

Pure oxygen, injected into the air blast in cupola operations, causes a rapid increase in metal temperature and melting rate, according to test results described in 8-page bulletin, "Improving Cupola Operations with Oxygen-Enriched Blast". Applications covered include both iron and steel. *Linde Air Products Co., Union Carbide & Carbon Corp.*

718 Foundry equipment

Fifty-one-page pitcure book shows all types of foundry equipment both in the shop and in use. Book is divided into 3 major sections for easy use: core room systems, covering new sand receiving, sand drying and cooling, core sand preparation and distribution, and core handling; foundry systems, including mold conveyor and shakeout, return sand handling, sand preparation and distribution, and dust and smoke abatement; and cleaning room systems, covering casting handling, knockout and refuse sand, sprue cleaning, coke and stone handling, chip drying, and briquetting. Bulletin 184 is a complete and interesting job. *C. O. Bartlett & Snow Co.*

719 No smoky ducts

Guarding against panic and damage from smoke accidentally introduced into the intake of air conditioning systems is the subject of 4-page Bulletin 521. It details three instruments designed to monitor the density of gas passing through ducts. When gas exceeds a predetermined density, indicator shuts off blower. *Esa Instrument Co.*

720 Magnetic tools

Illustrations, specifications, and prices of 16 standard, hand-operated, permanent magnet tools are contained in Catalog M-30. Designed as a file reference, it is condensed to 4 pages. Included are tools for handling, salvaging, sorting, separating, detecting, and similar operations. *Magnetool Div., Multifinish Mfg. Co.*

721 Duplexing data

Bulletin FO-4 gives many suggestions on how to improve existing duplexing systems and how to establish efficient new duplexing arrangements in its 8 pages. Coverage is quite complete. *Whiting Corporation.*

722 Heat treating

Six-page bulletin "Radivection" gives details on a line of furnaces used for hardening, annealing, normalizing, tempering, and similar operations in the temperature range from 250 to 1750 F. Preheating of the initially coldest zone is accomplished by introducing the hot gases around the outer periphery of the work basket at the bottom only. Heat is transferred to the lower part of the load essentially by radiation. Concurrently, the blower forces the hot gases through the load from top to bottom with enough pressure and velocity to assure penetration and heating of densest recommended loads. *Standard American Eng. Co.*

723 Bucket loader

Bucket loader designed to speed handling of foundry sand is described in Bulletin

continued on page 84

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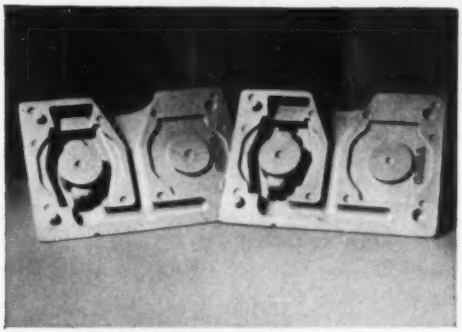
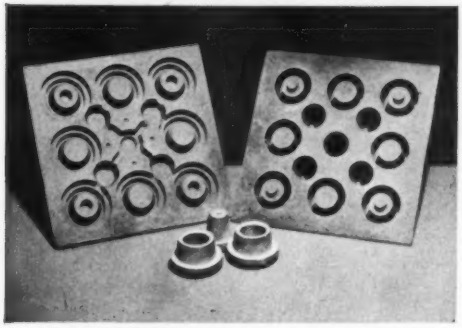
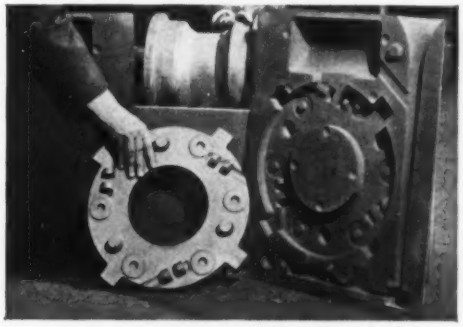
Check these advantages of shell molding



Excellent surface finish of the shell



Castings with dimensional accuracy comparable to precision castings



Large castings possible with excellent finish requiring little or no clean up

Look to Monsanto for the newest developments in shell molding

3 new products are among Monsanto's contributions to the foundry industry

You—like hundreds of other foundrymen—can look *first* to Monsanto for the latest developments, information, and know-how on Shell Molding . . . because Monsanto's search for new, improved products and processes for foundry use is conducted in a well-equipped foundry laboratory.

3 New Research-Built Products

Among several outstanding products developed by Monsanto are two new RESINOX phenolic resins that have been research-built for shell molding: RESINOX 0187A and RESINOX 0188. These two new resins supplement Monsanto's RESINOX 1128 (still the most used resin for shell molding) and Monsanto's phenolic and urea core binder resins.

Another new development from the Monsanto foundry laboratory is RESINOX Dust Suppressant A—which, when added to the resin-sand mixture, eliminates or greatly reduces dusting.

New Booklet On Shell Molding Now Available

Foundrymen, interested in Shell Molding (and resins for core binders), find Monsanto a ready source for the *latest* information and know-how . . . as well as the latest materials. Write for the new booklet which gives latest information on techniques and materials for shell molding. Just mail the handy coupon.

Resinox: Reg. U. S. Pat. Off.

MONSANTO CHEMICAL COMPANY,
Plastics Division, Room 5610, Springfield 2, Mass.

- ☐ I'd like a copy of your new booklet: "The Shell Molding Process."
- ☐ Please send information on urea and phenolic core binder resins.

Name & Title _____

Company _____

Address _____

City, Zone, State _____

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY...WHICH SERVES MANKIND

Grand Haven cures a wide variety of sand cores electronically . . . finds that improved core quality reduces casting rejects.

"Cuts core-baking cost 46% ...saves over $7,000 a year"

SINCE replacing conventional ovens with THERMEX® Core-baking Equipment, the Grand Haven Brass Foundry, Grand Haven, Michigan, reports a drastic cut in core-baking costs. A detailed comparison of old and new methods shows these results:

	Old Method	With Thermex Core-Baking Equipment
LABOR COST per 1000 lbs. of cores	$19.82	$ 6.29
OTHER COSTS per 1000 lbs. of cores (Floor space . . Sand and Binders . . Utilities . . Maintenance . . Rejects)	$12.19	$10.84
TOTAL COST per 1000 lbs.	$32.01	$17.13

This amounts to a saving of 46% or more than $7,000 per year.

Management at Grand Haven follows a progressive policy of providing for a continual growth in production volume. Even running at half capacity, the THERMEX Core-baking Equipment is already producing more than the equipment it replaced, and the production rate can be *doubled* without adding further capacity, or using more floor space. Also, with a growth in output, the savings will increase.

Take advantage now of this cost-cutting equipment. A THERMEX field engineer will be glad to show you detailed studies of installations like this, which give complete cost data. Write The Girdler Corp., Thermex Division, Louisville 1, Kentucky.

Partial List of Companies Who Have Purchased Thermex Electronic Core-Baking Equipment

- Albert Lea Foundry Co.
- American Brake Shoe Company
- American Hardware Corporation
- Atlantic Steel Castings Co.
- Brugger Mfg. Company
- James B. Clow & Sons
- Crane Company
- Drake Non-Clinkering Furnace Block Co., Inc.
- Ford Motor Company
- Fundicao Tupy
- Grand Haven Brass Foundry
- Grinnell Corporation
- International Harvester Co., Ltd.
- Moline Malleable Iron Company
- Mueller Company
- National Malleable & Steel Castings Company
- Ontario Malleable Iron Co., Ltd.
- Phoenix Brass Fittings Corp.
- Rolle Manufacturing Co., Inc.
- Ronci Company, Inc.
- Sterling-Faucet Company
- U. S. Pipe & Foundry Company
- Walworth Company

The GIRDLER Corporation

THERMEX DIVISION

Accurate

SINGLE IMPRESSION DUMP BOX

Best...and Least Expensive

It is obvious to an experienced pattern engineer that this master core plug pattern can be constructed more accurately and in less time than a carved cavity.

You may be sure that aluminum castings made in plaster molds are not only more accurate but will require less finishing time.

You will profit both ways by using this modern method.

Send for new illustrated brochure.

Master core plug pattern and ribbing frame.

Providing for metal thickness with clay sheets.

The "as cast" core box.

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Telephone Normal 8551-5

LOS ANGELES, CALIF.
McGowan Company, Inc., *Telephone* Trinity 2057

"Rejects have been reduced to an absolute minimum since using EDCO Dowmetal BOTTOM BOARDS"
says BOB PETCHER
FOUNDRY SUPERINTENDENT
JOSAM MFG. CO., MICHIGAN CITY, IND.

EDCO DOWMETAL Bottom Boards in use at Josam Manufacturing Company, world's largest manufacturer of plumbing drainage products

"Light, easy to handle, practically everlasting, EDCO DOWMETAL Bottom Boards have been a potent factor," says Petcher, "in improving our quality of castings and increasing our output.

"Our old wood boards had a life of about two weeks; and toward the end of their life-span, they always produced some poor castings which had to be rejected.

"EDCO Boards are just the opposite—they are *permanent equipment.* We've been using EDCO DOWMETAL Bottom Boards for more than four years—have used them almost 10,000 times—and they are still in perfect condition.

"These boards have paid for themselves many times over."

You, too, can save time, space and substantial cash sums by using EDCO DOWMETAL Bottom Boards.

They're easy to handle—light. They stack in small space, easily and securely. They last indefinitely—built for it.

Above all, like Josam, you get better castings, fewer rejects—a big saving.

Write us, or phone CApitol 7-2060 for price schedule and list of 78 standard sizes available from stock.

CHRISTIANSEN CORPORATION

1521 NORTH KILPATRICK AVE.
CHICAGO 51, ILLINOIS
ALUMINUM ALLOY INGOTS
ZINC BASE DIE CASTING ALLOYS

for improved
casting finish
with no burn-ins,
flash or fins . . .

"Performance *plus* what?" you might ask. We hope you do . . . hope you're interested enough to let us demonstrate the many benefits to be derived through your use of Stevens SLICK-SEAL mudding compound.

First, there is the convenience of using a compound that remains plastic and workable during an entire 8-hour shift. Yet, light applications of SLICK-SEAL air-dry in from 1 to 2 hours; heavy applications take only 4 to 5 hours.

Coremakers have a special word to describe its application qualities on pasted joints, core crevices and rough core surfaces. "Slick," that's the word and that's the way SLICK-SEAL goes on, smooth and easy with no crumbing, rolling or balling up behind thumb or finger. It leaves the hands clean . . . a most important advantage to women core workers.

Feather edges do not shrink or curl when subjected to oven or metal heat. Flowing metal can't dislodge SLICK-SEAL, cause it to flake, peel or spall off. SLICK-SEAL positively prevents fins or burn-in at pasted joints, because the compound itself is an excellent, high heat resistant facing. Covered by a core wash or not . . . *it improves metal finish.*

ORDER SLICK-SEAL TODAY
. . . at our risk!
If you do not find it to be superior to the compound you're now using, return any unused portion for complete credit or your money back. You must be satisfied!

use Stevens

SLICK-SEAL MUDDING COMPOUND

you'll get performance plus!

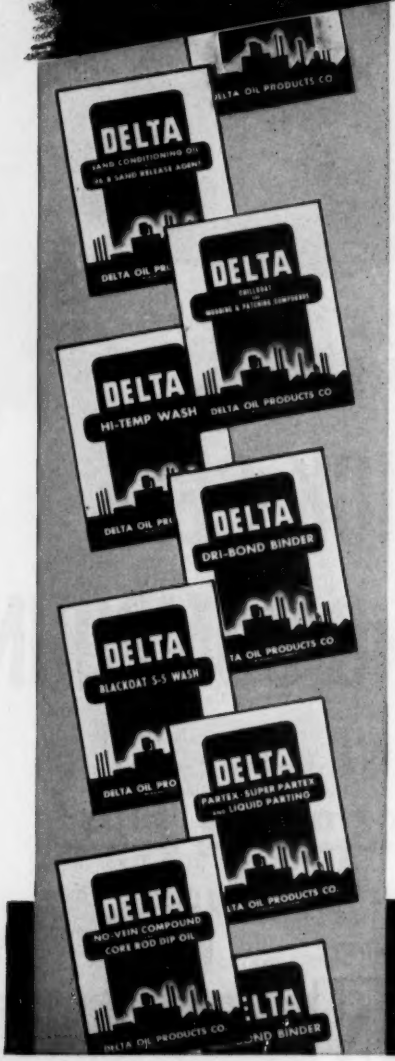
"EVERYTHING FOR A FOUNDRY"
TRADEMARK

FREDERIC B. STEVENS INCORPORATED
DETROIT 16, MICHIGAN

DELTA *Specialized* FOUNDRY PRODUCTS

FOR FASTER PRODUCTION OF FINER-FINISH CASTINGS

... at lower cost!



FOR SAND

DELTA Permi-Bond (seacoal replacement)
Sand Conditioning Oils
96-B Sand Release Agent

FOR CORES

DELTA Core & Mold Washes for steel, malleable, gray iron and non-ferrous metals.
Mudding and Patching Compounds
No-Vein Compound
Dri-Bond Binder
Core Rod Dip Oils
Sand Conditioning Oils
Core Oils
Partex
Liquid Parting
Bondite

FOR MOLDS

DELTA Core & Mold Washes for steel, malleable, gray iron and non-ferrous metals.
Partex (Nut Shell Parting)
Liquid Parting
Spray Binders
Bondite

The quality and uniformity of DELTA SPECIALIZED FOUNDRY PRODUCTS are laboratory controlled to insure consistent results in use. Liberal working samples, together with complete instructions for use will be sent to you without cost or obligation. WRITE TODAY.

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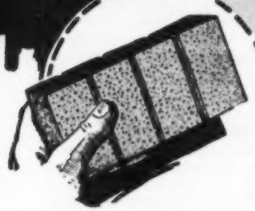
BESIDES CLEANSING MOLTEN IRON AND SAVING YOU THOUSANDS OF DOLLARS IN CASTING REJECTS, FAMOUS CORNELL CUPOLA FLUX GIVES AN EXTRA SERVICE BY REDUCING CUPOLA MAINTENANCE TO PRACTICALLY NIL.



Approx. 4 pound brick

Pre-Measured
SCORED BRICK FORM

Famous Cornell Cupola Flux takes practically no labor to use. Just lift it out of container and toss into cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller charges, as per instructions.

Famous CORNELL CUPOLA FLUX

OVER 34 YEARS' SUCCESS IN MAKING METAL BETTER FOR BETTER CASTINGS.

Famous Cornell Cupola Flux purges molten iron of impurities and increases its fluidity, so that only perfectly conditioned iron reaches your molds.

The result is sounder, cleaner, more even grained castings in gray iron foundries and malleable foundries with cupolas.

THE CUPOLA before using Famous Cornell Cupola Flux

Famous Cornell Cupola Flux keeps cupolas cleaner. Bridging over is practically eliminated. Drops are cleaner.

And by forming a glazed or vitrified surface on brick or stone, it reduces erosion of cupola lining thereby prolonging the period between patching and replacement.

THE CUPOLA during the use of Famous Cornell Cupola Flux

Write for Bulletin No. 46-B

The Cleveland Flux Co.

1026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918

FAMOUS CORNELL FLUXES
Trade Mark Registered

BRASS FLUX — FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX — FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

"EXTRA TOOL LIFE?"
"Absolutely," says a volume producer. "We machine 35% more gray iron castings per tool—when those castings are poured from iron deoxidized with FERROCARBO Briquettes. That's why we've standardized 100% on FERROCARBO."

FERROCARBO

TRADE MARK

Briquettes

by CARBORUNDUM

make your castings CLEANER...MORE UNIFORM...MORE WEAR RESISTANT...MORE RESISTANT TO THERMAL SHOCK...EASIER TO MACHINE (extra tool life)

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PITTSBURGH
Cleveland, Birmingham, Philadelphia and Buffalo

MILLER & COMPANY
CHICAGO
St. Louis and Cincinnati

FERROCARBO Briquettes are manufactured under U.S. Patents 2,119,521 and 2,497,745. U.S. Patent 2,020,171 covers a process of making cast iron through the utilization of FERROCARBO.

Made in Canada by
CANADIAN CARBORUNDUM COMPANY, LTD.,
Niagara Falls, Ontario

Distributed by WILLIAMS & WILSON, TORONTO,
Montreal and Windsor
and by KERCHNER, MARSHALL & CO., Buffalo, N. Y.

84-84

Foundrymen in the news

E. L. Waterhouse

Ernest L. Waterhouse is now resident manager of the Eaton Mfg. Co., Foundry Div., Vassar, Mich. Formerly plant manager, he succeeds the late **James H. Bernard** in his new capacity. Former affiliations include Detroit Stoker Co., Dodge Bros. Motor Co., and Holley Carburetor Co.

James W. Hallock has been named sales manager of the Albion Malleable Iron Co., Albion, Mich., succeeding the late **Jackson D. Waterbury.** He has been associated with the firm for 1½ years. Previous affiliations include Mid-West Abrasive Co. and Benton Harbor Malleable Industries, both of Benton Harbor, Mich.

J. D. Judge, chief engineer for the Hamilton Foundry & Machine Co., Hamilton, Ohio, wrote *"Management's responsibility in training"* on pp. 47-50 in this issue. Mr. Judge graduated from University of Cincinnati in 1924 with a BS in Mechanical Engineering. His career with Hamilton started in 1917, when he worked in the office after school. After one year as a draftsman, he worked in various departments to gain experience. After being in charge of the melting and the metallurgical departments, he assumed his present position in 1947. He is a director of the Cincinnati Chapter of A.F.S. and a past chairman.

Randolph L. Ruhley has been appointed resident sales manager for Cleveland Vibrator Co., Cleveland. His territory covers the 10 Atlantic coastal states from Maine to Maryland.

Walter W. Edens has joined the sales engineering staff of Federated Metals Div., American Smelting & Refining Co., New York. He will work primarily with the foundry trade. Recently with Alloy

J. W. Hallock

Engineering & Casting Co., Champaign, Ill., he was previously vice-president of Badger Brass & Aluminum Foundry Co., Milwaukee, Wisconsin.

Howard K. Chapman was recently named executive vice-president of H. Kramer & Co., Chicago. At the same board meeting, **Emanuel Singer** became vice-president in charge of purchasing, and **E. S. Schwartz** was elevated to vice-president and general works manager of plants in Chicago, Philadelphia, and Los Angeles. All are veteran employees.

J. A. Hill is the new manager of industrial sales for Independent Pneumatic Tool Co., Aurora, Ill. Succeeding him in his former job of manager of electric tool sales is **J. F. Corkery,** whose former job of sales promotion manager will be assumed by **G. A. Thoma.**

John B. LaPota and **Lee H. DeWald** both work for National Cylinder Gas Co. in Chicago, so it was no trick for them to collaborate in writing *"Oxygen in the malleable foundry"* which starts on page 35 of this issue. Mr. LaPota is a graduate of the University of Illinois. His first job was with National Research Laboratories in Chicago in 1935. From 1936 to 1941 he was with United States Steel Corp., first in Chicago as an apprentice and then in Gary as a foreman. Emerging from the army in 1945 as a captain in the Chemical Warfare branch, he joined National Cylinder Gas as an engineer and is still with them. Mr. DeWald received his BS and MS degrees from the Missouri School of Mines, and spent several years as development engineer at Western Electric Co., Chicago. Goldsmith Bros. Smelting and Refining Co., Chicago, was his next stop, followed in 1936 by a job with Fansteel Metallurgical Corp. in North Chicago, and in 1944 with Archer & Smith Ltd., Lexington, Ky. A year later he joined the metallurgy department at M.I.T., only to return to industry with his present company. He is an active and popular speaker on a wide list of topics, and has been a consultant on cemented carbides and powder metallurgy problems for many years.

William L. Wearly has been appointed vice-president in charge of domestic sales for Joy Mfg. Co., Pittsburgh. Domestic sales includes Canada and Mexico. Mr. Wearly joined the engineering staff of Joy in 1937 and has served as service manager and vice-president of their Coal Machinery Sales Dept.

Paul E. Kiefer, plant engineer for the Monroe Steel Castings Co., Monroe, Mich., is the author of the snagging wheel article that starts on page 32. He is a registered professional engineer in both Michigan and Ohio and a graduate of Ohio State University. Columbus (Ohio) Malleable Iron Co. hired him on graduation in 1926, but he moved on in

J. B. LaPota

L. H. DeWald

P. E. Kiefer

1928 to Lake City Malleable Co. in Cleveland. His next position was as chief engineer for Edwin S. Carman Inc., Cleveland. In 1941 he took over as plant engineer for West Michigan Steel Foundry Co. in Muskegon, moving to Monroe Steel Castings Co. in the same capacity in 1948.

Morse G. Dial has been elected president of Union Carbide & Carbon Corp., New York. **Kenneth H. Hannan** has been elected its treasurer, and **Walter E. Remmers** has been elected vice-president of its Alloys Div. New president of Linde Air Products Co., a UC&C division, is **Thomas D. Cartledge.** Bakelite Co., another UC&C division, will be headed by **Howard S. Bunn.** Named to key positions at UC&C's research laboratories are director of research, **Arthur R. Lytle,** associate director of research **Walter Crafts,** and assistant director of research **David Swan.**

Paul D. Merica was elected president of International Nickel Co. of Canada, Ltd., at the recent board of directors meeting. **John F. Thompson** continues as chairman of the board and chief officer of the company. **R. Leslie Beatty** will serve as a member of the executive committee of the board and as a director of the company's United States subsidiary, International Nickel Co., Inc. **H. F. C. Mockbridge** was also elected to the executive committee.

Harry E. Orr was appointed assistant vice-president and manager of engineering sales for Vanadium Corp. of America, New York, with headquarters in Chicago.

W. Lyle Richeson, former vice-president of American Car & Foundry Co., New York, was elected vice-president of Westinghouse Air Brake Co., Wilmerding, Pa.

Leroy C. Voss, co-author of the colored core sands article on pages 44 and 45 of this issue, started his industrial career with an international flavor. After graduating from the University of Cincinnati, he went to work for The Cuba Co. in Ingenio Jabaco, Cuba, as chief chemist. Federal Color Laboratories in Norwood, Ohio, lured him back to the United States in 1920. January 1921 found him with Geigy Co., Inc., New York, where he still is employed. Co-author **Walter W. Lynn** is another native Ohioan, born in Johnstown and holding a degree in Chemical Engineering from Ohio Northern University. Mr. Lynn joined Ohio Steel Foundry Co., Lima, Ohio, in 1938, and worked as a heat treater until 1949 when he was promoted to his present position as metallurgist.

Charles F. Scherer retired July 1 as vice-president and general manager of Davenport Machine & Foundry Co., Davenport, Iowa. Mr. Scherer was mainly responsible for the improvement in products that made the company's ex-

C. F. Scherer

pansion possible. He entered the employ of the firm in 1910 as a machinist and was made machine shop foreman a year later. He was advanced to general supervisor in 1923 and a few years later became general manager. The duties of vice-president were added to this in 1938. He is a past president of the Quad-city chapter of A.F.S.; the Tri-city chapter of ASM; and the Tri-city Technical Council. He is currently a member of the board of directors, and last year was a national board member of the Gray Iron Founders' Society. Mr. Scherer plans to spend his winters in California and his summers at his home in Davenport.

George A. Most Jr. has been appointed district sales manager at Moline, Ill., by Link-Belt Co., Chicago. He succeeds **Stuart T. Penick,** who will become sales engineer at Link-Belt's Colmar, Pa., plant.

Stafford C. Reynolds and **E. R. Darby** have retired from the Federal Mogul Corp., Detroit. Reynolds, who was senior vice-president and treasurer, will continue as a member of the board of directors. **Edwin O. Jones,** vice-president and secretary, is the new senior vice-president; he will continue as secretary as well. **Samuel E. MacArthur** has been elected treasurer and will also retain his former title and duties as controller. **Gordon J. LeBrasse,** formerly superintendent of the research laboratory, will replace Mr. Darby as acting director of research and development.

Harry W. Link Jr. and **Andrew W. Scharrer** are the latest additions to the board of United States Radiator Corp., Detroit.

Fred C. Barbour, chief metallurgist for McWane Cast Iron Pipe Co., Birmingham, Ala., is the author of "*Making a synthetic pig iron*" on pages 54 and 55. Born in Watertown, Tenn., in 1915, he attended grade and high schools in Nashville but went to Cumberland University for his BS degree. Lone Star Cement Co., Birmingham, hired him as a chemist upon his graduation in 1937. By 1940 he was with McWane, first as

F. C. Barbour

research chemist, then supervisor of magnesium melting, then chief metallurgist. Among other things, Mr. Barbour was elected to the Small College All-America Football roster in 1936; and collaborated in making a 3-in. laboratory cupola which achieved world attention (see AMERICAN FOUNDRYMAN, May 1949, p. 62).

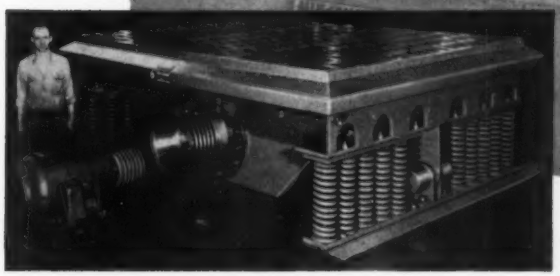
R. L. Maxwell, Major General, U.S. Army (ret.), vice-president in charge of personnel and public relations of American Machine & Foundry Co., New York, was recently elected vice-president of the American Ordnance Association's New York post. He has been a director of the post for several years and was national secretary of the AOA in the years 1925 and 1926.

Fred J. Ebeling has been chosen to fill the newly created post of general sales manager for Dodge Mfg. Corp., Mishawaka, Ind. He has been with Dodge since 1943, starting as credit manager.

F. H. Allison Jr. has been appointed assistant vice-president in charge of metallurgy and roll sales, a new post within the company, Blaw-Knox Co., Pittsburgh, recently announced. He will integrate sales and servicing functions of the two Blaw-Knox roll organizations,

continued on page 89

"FOUNDROMATIC" SHAKEOUTS



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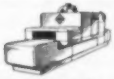

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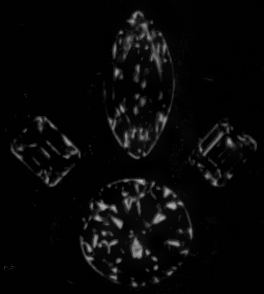

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Shell mold fog lifting . . .

■ Question of whether the basic processes of shell molding are in the public domain seems to be clearing rapidly as more and more foundries disclose their shell molding activities and recently issued government bulletins help clear the air. While some 100 foundries are estimated to be producing shell mold castings, some in high production since 1950, the patent picture hitherto has been obscure because no one knows whether patents are still pending or have been denied. None have been granted, however, and shell mold producers are safe from infringement up to the time a U. S. patent claim is upheld.

The shell molding or "C" process was developed in Germany by Johannes Croning and was in use there as early as June 1944. W. W. McCulloch of American Cast Iron Pipe Co., Birmingham, Ala., working on a U.S. technical intelligence team, located and interviewed Herr Croning on April 24 and 25, 1947. His report, FIAT Final Report No. 1168, dated May 30, 1947, made the process available to the Allies. All processes employed by Germany during World War II and up until January 1, 1946, were considered to be in the public domain, available to industry, and not patentable in the United States or any other allied nation.

Croning filed applications for U.S. patents December 3, 1947, and an estimated several hundred patents for refinements are believed to have been applied for during the last five years by U.S. foundrymen.

According to U. S. Department of Commerce bulletin IR-7734, referring to the Croning applications: "The policy of the U. S. Patent Office does not permit the release of either technical details or disposition of applications for patent. Since no patents have been granted on either of these applications they may be still pending, they may have been abandoned, or they may have been finally rejected.

"The declaration that the process as disclosed in the German patent application (filed by Croning in the German patent office February 1, 1944) is in the public domain saves any user from liability for infringement. Naturally, if a U. S. patent, or patents, should be granted on *specific improvements*, an industrial user must not employ such improvements without obtaining a license from the patent holder.

"Normally, a patent comes into effect on the date of issue. Therefore, in the absence of special contract obligations, a company which uses a variation of the process which is later claimed in valid U. S. patent, is not charged with infringement for the use prior to the date of issue."

Shell molding appears to be ready for broad use in the industry. A number of foundries have been producing shell mold castings for several years. Equipment manufacturers and resin producers have been working closely with the pioneers in mechanization of shell molding. A new tool for production of precise, smooth castings requiring a minimum of machining appears to be ready for mass use by the industry.

Finding the most profitable snagging wheel for the job

Until recently there has been no reliably accurate method of determining the real value of grinding wheel performance, and not enough known as to which wheel characteristics yield the ultimate. In fact, few users are able to supply any definite specifications for wheel manufacturers to meet. This article tells how one plant tests and selects snagging wheels for finishing miscellaneous steel castings on its stand grinders.

P. E. KIEFER / *Plant Engineer, Monroe Steel Castings Co., Monroe, Mich.*

■ The basic function of snagging wheels is the removal of metal. The wheel that removes the most metal with the least wheel and labor cost is the most profitable. The primary objective in determining the most profitable wheel, therefore, is to determine the wheel that will remove the most metal with the least amount of wheel wear and energy input.

Amount of metal removed is easily obtained by accurate weighing of castings before and after grinding. Accuracy is essential, since the removal will normally represent only 1.5 to 2.25 per cent of the gross weight after heads and gates are taken off.

Amount of wheel wear can be determined by either weighing or measuring the wheel before and after the test. Weighing will give the percentage of wheel consumed during the test. Measuring (either by scale from the flange out or by calipers) can be used to compute the volume consumed. Since all wheels of the same size of a particular type grain and bond cost about the same, regardless of weight, the user is paying for available volume. Therefore, the measuring and computing method has been employed throughout these tests.

High labor cost

Since the labor cost of stand grinding operations is normally about three times the wheel cost, this factor of the cost figure must be determined as accurately as possible and given the closest scrutiny.

This objective is accomplished by the instruments shown in Fig. 1 and 2. Meter shown in Fig. 1 was developed for use in setting earnings, standards, and bonus systems. It is calibrated in work units, which are proportional to watt-hours.

Meter shown in Fig. 2 was specifically designed for grinding wheel and cutting tool evaluation. Use of these two meters leads to the following information: total work and power input; work and power expended under free load; productive work and power; machine and wheel efficiency; contact time; cost of wheel per unit work output; and tangential force at wheel face.

What is it?

Tangential force is applied to the wheel in practice; it knocks used grains from the wheel and presents new cutting surfaces. It is the result of casting pressure, but is the force along the tangent to the wheel at right angles to wheel radius at the point of contact. It is a function of wheel speed and power input to the wheel due to grinding.

Table 1 represents 21 tests of wheels supplied by 12 different manufacturers. High-speed resin wheels were used; each test represents an average of two wheels of the same specifications, with two different operators. Individual tests have been repeated with an accuracy within 10 per cent.

Tangential force in these tests was about 25 lb per contact square inch. Tests ran for one week, with three speed changes made during the life of the wheel; average speed during the test was about 9200 sfpm.

To remove the human element as much as possible, the same two men were used at all times. They were deliberately chosen of opposite temperament and work habits. A standard in work units was set up, and correction was made to equalize the

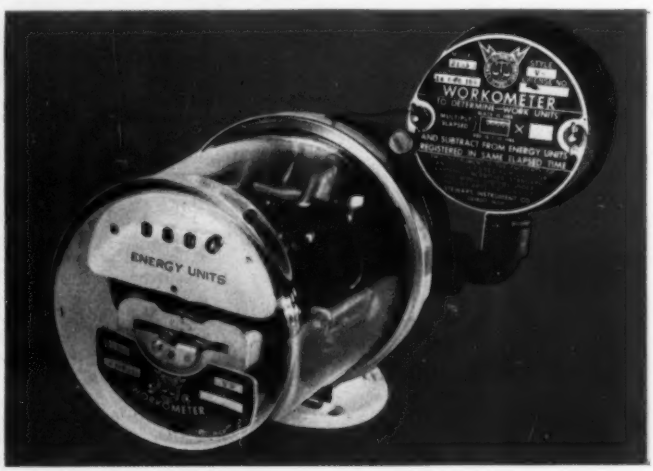


Fig. 1 . . . Although limited in scope (it does not give contact time or tangential force), this instrument is unaffected by voltage fluctuations in the shop.

evaluation if the men either overworked or did not meet standards. Since the men were not on piece work, it would have been unfair if a full day's work had been charged against the wheel being tested when more or less of the standard day's work was actually done.

A standard was also set for cutability in watt-hours per pound of metal removed, with labor costs adjusted accordingly. The standard was one energy unit per pound of metal removed. If the wheel test showed that the cutting quality of the wheel was such that it required 1.10 units per pound removed, the labor cost was penalized by 10 per cent, on the theory that 10 per cent more work would have been done with the same amount of energy if the wheel were up to standard.

How it was done

Figures 3 and 4 show the layout used in making the tests. Scale used in the initial weighing is shown in Fig. 3. Containers full of mild steel castings passed over this scale and the weight was recorded. A zero reading was obtained when empty pans rested on the platform. Full containers were then conveyed to stands and operators shown in the background.

After castings were ground, they were passed along roller conveyors and weighed on the car scale shown in Fig. 4. Containers had been check-weighed on this scale before grinding started. Weights and meter

TABLE I—TEST RESULTS

Maker's designation	Wheel designation	Watthours per pound removed	Cu. in. wheel/lb removed	Cost per pound removed				Rating in per cent
				Wheel	Labor	Power	Total	
1	A	148	1.34	.0685	.1975	.0018	.2678	100
2	B	147	2.03	.1056	.1930	.0018	.3004	89
2	C	159	2.35	.1220	.2275	.0019	.3514	76
3	D	172	1.63	.0860	.2655	.0020	.3535	76
4	E	180	1.65	.0864	.2890	.0021	.3775	71
4	F	170	2.31	.1205	.2610	.0020	.3835	70
5	G	174	2.24	.1165	.2705	.0020	.3890	69
6	H	190	1.66	.0870	.3260	.0023	.4153	65
7	I	195	1.56	.0819	.3465	.0023	.4307	62
8	J	198	1.63	.0852	.3515	.0023	.4390	61
8	K	195	1.93	.1010	.3400	.0023	.4433	60
7	L	205	1.49	.0781	.3790	.0024	.4595	59
9	M	205	1.65	.0865	.3730	.0024	.4619	58
10	N	205	1.65	.0861	.3780	.0024	.4665	57
6	O	183	3.31	.1728	.2920	.0022	.4670	57
9	P	208	1.79	.0935	.3900	.0024	.4859	56
11	Q	209	1.89	.0967	.3910	.0025	.4902	55
11	R	217	1.80	.0925	.4230	.0026	.5181	52
12	S	222	1.73	.0900	.4450	.0027	.5377	50
4	T	221	2.14	.1120	.4400	.0026	.5546	48
1	U	215	2.72	.1417	.4200	.0026	.5643	47

Table 1 . . . Wheel analysis based on pounds of steel removed. Results demonstrate quite clearly that soft wheels are not necessarily good cutting wheels (see wheels O and U), and that hard wheels can have good cutting qualities (for example, wheel A). Cutability is shown to be almost entirely independent of the grade of wheel. Work units were converted to watthours in the third column of figures; wheel designation given in second column is purely arbitrary, and has no relation to manufacturers' usual ratings of grades of wheel hardness.

Fig. 2 . . . Useless when voltage varies, this instrument supplies all the factors.

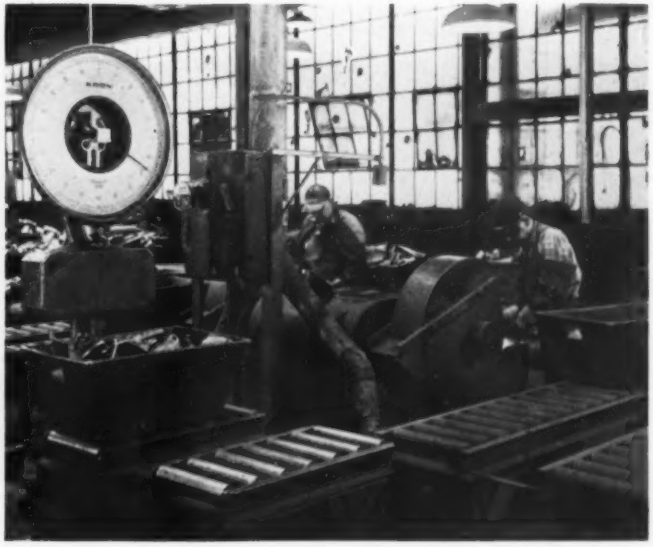


Fig. 3 . . . Set-up of the wheel tests. Scale is recording weight of unground castings; tote box weight has been compensated. Notice meter on post by scale.

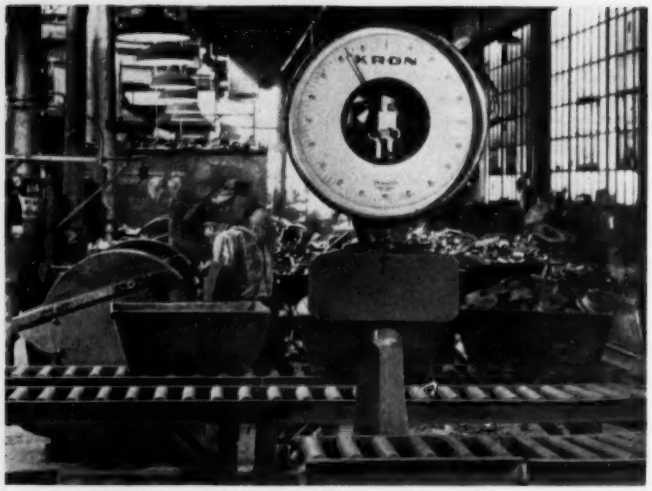


Fig. 4 . . . Another view of the testing operation. This shows the second scale, used to find loss of metal during grinding. Notice compensation for tote box.

readings were then used to compute the figures comprising Table 1.

Tests established the following:

1. The softest wheel is not always the best cutting wheel.

2. Ordering hard wheels in order to get long wheel life to the detriment of fast grinding is not economical, even though the shop operates on a piece-work basis. A saving of 10 cents on wheel cost per pound of metal removed might easily raise the labor cost 30 cents, since labor cost is about three times wheel cost. Piece rates will automatically find a higher level over a period of time for poorer cutting equipment.

3. There is very little similarity in wheel characteristics of the different makers for the same grade. A wheel rated O hardness by one maker might compare with a Q wheel of another.

4. Chip clearance is a very important factor in cutability. Chips of the material being ground must have sufficient room between cutting edges to fall free once cleared. Otherwise, wheel loading results, which presents a glazed instead of a cutting surface and results in the need for over-dressing the wheel. When the clearance is too large, not enough cutting edges are available, and the work may be scratched instead of properly cut.

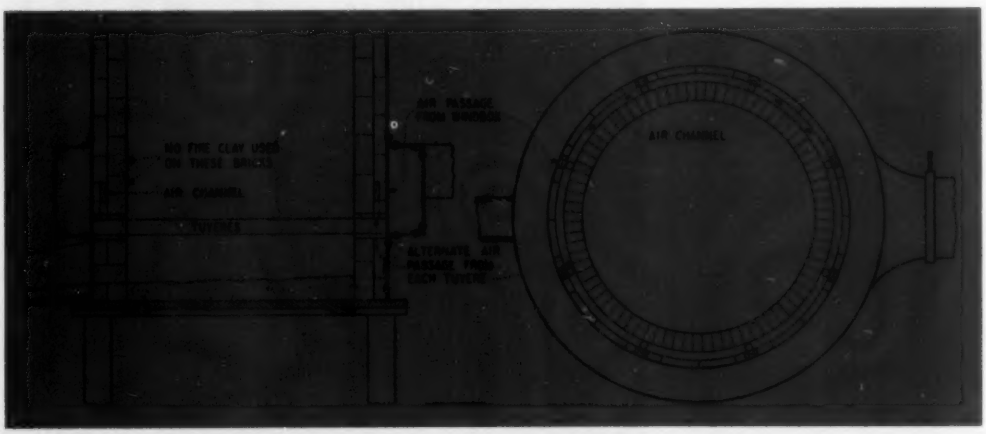
Bond strength

5. The bond strength must be just enough to release the grain when it has become too dull to cut.

6. A properly designed wheel will need very little dressing thus eliminating unprofitable wheel loss from the picture.

7. Tangential force is the important factor in proper wheel design. It must be supplied to the manufacturer if he is to supply the correct wheel for a given application. A wheel can be made to meet other specifications, but if the determination of the manufacturer is based on the wrong tangential force, the wheel will not meet the requirements that have been established.

now, there's an idea!



Devised by Daniel Melander, retired melting superintendent, and used since 1917 by H. C. Macaulay Foundry Co., Berkeley, Calif., this self-cooling lining system works in any cupola. Bricks are placed tightly in melting zone without fire clay or daubing between or behind them. Air hole of 1 to 2 in. diameter is drilled into wind box or each tuyere, allowing air to pass through 1 x 4 in. channel behind bricks. When lining burns down to ½ in., bricks are replaced. Cupola is operated in usual manner. Suggested test: line half the cupola circumference this way, half standard way—compare.

For melting, annealing . . .

Oxygen in the malleable foundry

J. B. LA POTA / *Research Dept., National Cylinder Gas Co., Chicago*
L. H. DE WALD / *Sales Dept., National Cylinder Gas Co., Chicago*

The use of oxygen in malleable operations appears to have considerable merit. Tests and data are as yet incomplete, but the trend toward better melting and annealing is clear. This paper was presented by the authors at the A.F.S. Wisconsin Regional Foundry Conference, Milwaukee, February 7 and 8.

■ The proven advantages of oxygen in the refining of electric furnace and open hearth steels have been responsible to a great extent for its rapid adoption by the steel industry. It is therefore not surprising that a number of malleable iron shops have been carrying out a program to investigate the practicability of using oxygen in their own process.

Since these programs are of comparatively recent origin, the test data accumulated to date are limited. Nevertheless, analysis indicates that the use of oxygen as a metallurgical expedient in the malleable foundry is scientifically and economically feasible. It is only necessary to conduct additional tests in order to get a more accurate appraisal of the actual benefits derived from the use of oxygen in melting, annealing, and other malleable operations.

The most noteworthy progress recorded in the present research program has been the application of oxygen for fuel enrichment in the air furnace employing a cold metal charge; for oxidation of certain elements to desired lower concentration in the air furnace; for improving cupola operation in the cupola-air furnace duplexing process; and for use as a combustion agent in pulverized coal-fired annealing.

Combustion principles

Most of the operations developed so far involve its use as an agent for combustion. Any discussion concerning the use of oxygen for fuel enrichment calls for a review of some of the more important fundamentals of combustion. Such a review is especially helpful in obtaining an accurate interpretation of the test results available.

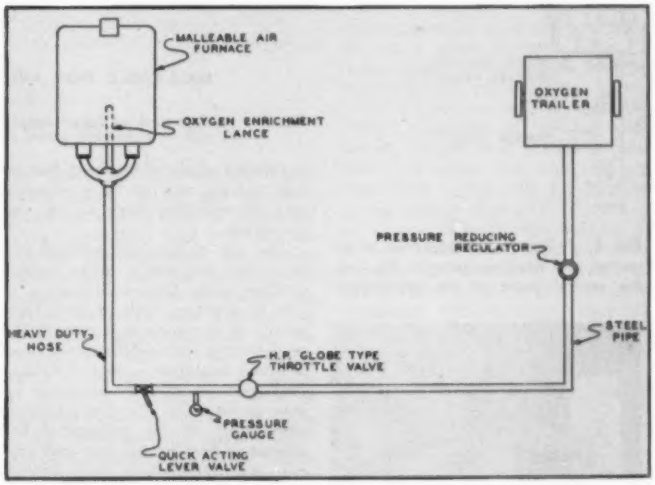


Fig. 1 . . . Sketch of complete oxygen system used for enrichment experiments.

Three fundamentals

Three of the more important items describing the fundamentals of combustion of pulverized coal fuel with air and oxygen-enriched air are (1) the primary combustion reactions involved; (2) the mechanism of combustion of solid fuels; and (3) a comparison of the combustion characteristics of normal air and oxygen-enriched air with pulverized coal fuel. The mechanism of combustion of pulverized coal is a somewhat complex phenomenon, and the theory accurately describing this mechanism has not been fully established. For that reason any attempt at a detailed treatment of the combustion of pulverized coal will necessarily be speculative. Still, even though the observations made during the fuel enrichment tests do not alone suffice for a clarification of the reaction mechanism, they are nevertheless interesting and clearly suggest certain definite conclusions.

In the process of pulverized coal oxidation with normal air (containing approximately 21 per cent oxygen and 78 per cent nitrogen by volume) it is conceivable and probable that a number of successive reactions take place in the transition from a solid coal particle to gaseous products of combustion. We can think of each coal particle as a sphere almost completely enveloped by a quantity of air sufficient to carry out combustion. This particle

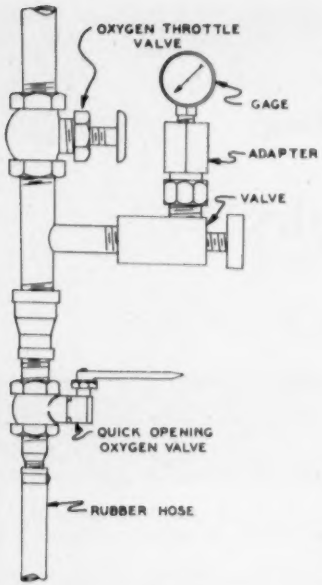


Fig. 2 . . . Showing arrangement of the station and hose equipment. This was the control point of the experiment.

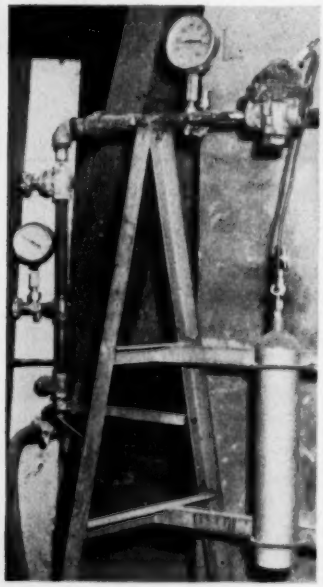


Fig. 2a . . . Photograph illustrates the diagram above. Units along left side are those shown in Fig. 2. Hose at bottom runs to the water-cooled lance feeding oxygen to the furnace.

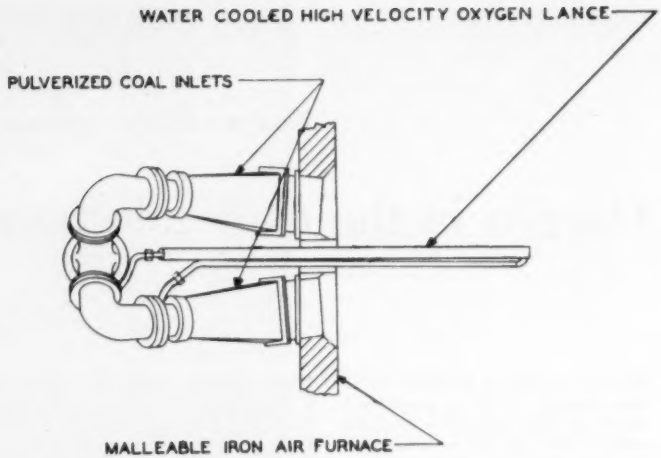


Fig. 3 . . . Top view of lance supplying oxygen to malleable iron air furnace.

is capable of absorbing heat, becoming ignited, and in turn releasing and transporting heat to its surroundings.

The size of the coal particle provides an unusually large specific surface area, thus accelerating its rate of reaction with oxygen. Generally, if the oxygen concentration of the air is increased, more oxygen becomes available to each individual coal particle, thus accelerating the rate of reaction. The first stages of combustion of the pulverized fuel consist of heating the fuel and oxygen up to the ignition point. Ignition includes not only the actual flame production but any preliminary change in the coal particles such as the volatilization of highly combustibles. This action takes place as a result of high ambient temperature which heats the particle and its volatile constituents to the ignition point.

Volatiles driven off

During this initial period the volatile components of the solid coal particles are driven off, and the reaction progresses until the terminal products of complete combustion are formed—CO_2 and H_2O. With oxygen-enriched air (say 24 per cent oxygen as compared to normal air at 21 per cent oxygen), more heat is constantly produced, causing more rapid ignition of the surrounding particles. The resulting incandescent particles of slag or ashes are much hotter with pure oxygen as an oxidant than with air, thus causing an increase in transfer of heat by radiation to the furnace walls and charge.

A completely acceptable method of measuring flame temperatures is very difficult indeed, except perhaps by a measure of the radiated energy as a function of temperature. Insofar as the melting of scrap in an air furnace with pulverized coal is concerned, we can adopt empirical methods for measuring flame temperature. For example, the characteristic color and other conditions of the flame reflect the influence of flame temperature on the rate of heating the furnace refractories and on the melting rate of the scrap charge.

With the addition of oxygen to the flame this heating process is accelerated. The characteristic flame is lighter in color, clear, and shorter than an ordinary air-pulverized coal flame. When air alone is used there are vehicles to carry away some of the sensible heat of combustion. These vehicles are nitrogen and moisture, which reduce flame temperature.

Results of tests show that the efficiency of combustion of pulverized coal fuel is measurably improved by adding controlled quantities of oxygen to the air. With more oxygen available for combustion, the rate of reaction (or burning rate) of the fuel is increased. More complete combustion occurs, resulting in a higher flame temperature.

In an air furnace, the rate of heat transfer to the charge is increased, thus improving its melting

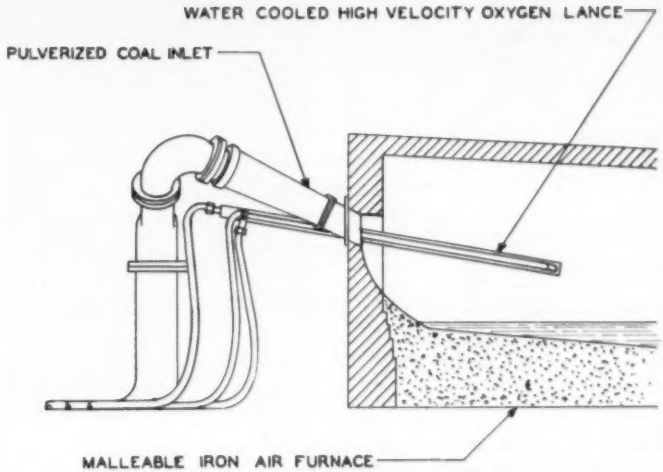


Fig. 4 . . . Front view of the same oxygen lance illustrated in Fig. 3.

rate. In an annealing furnace, the increased rate of combustion and the accompanying advantages of oxygen result in attaining the required annealing temperature in less time.

Malleable air furnace

Initial oxygen tests were conducted at several different malleable shops. There are no two practices that are exactly alike in the industry, since each practice is peculiar to the shop. Consequently, even though there is a striking parallel between the methods of application of oxygen, there was some variation in the test results obtained. These differences were anticipated; consequently, before undertaking the program, the existing furnace installation and facilities were inspected to determine the most practical method of applying the oxygen enrichment process.

The oxygen installation and equipment employed during the series of tests in one plant consisted of a high-pressure supply system having a capacity of 33,000 cu ft of high-purity oxygen. The oxygen was directed through a pressure-reducing regulator which allowed a reduction and adjustment of the oxygen pressure to approximately 100 psi. A schematic diagram describing the oxygen installation and furnace layout is shown in Fig. 1.

Oxygen was conveyed through a $1\frac{1}{2}$-in. pipe line that extended from the oxygen delivery system to the furnace terminal. At a position near the air furnace was a station control unit consisting of a throttle valve, quick acting valve, and pressure gauge. A 25-ft length of horizontal braid heavy duty hose provided the flexible link between the station control unit and the water-cooled oxygen lance. The static and flowing oxygen pressures were indicated by a pressure gauge mounted on the downstream side of the throttle valve, which provided a rapid means of adjusting flowing pressures as required in the operation. The quick acting valve provided positive control of the oxygen flow. This equipment is shown in Fig. 2 and 2a.

Since design features of a furnace dictate the type of oxygen device to be employed, a study of furnace construction and design was made. This prompted the use of a high velocity, water-cooled, nozzle type lace for conveying the oxygen into the furnace. This lance was positioned in the center of and directly below the pulverized coal-air inlet ducts, at the end of the furnace, as shown in Fig. 3 and 4. The oxygen lance was retractable, positioned so that the oxygen was directed into the pulverized coal stream and mixed with the coal-air mixture at the point of convergence of the stream. In this way an intimate mixture of the oxygen and pulverized coal was obtained.

Pre-mixing the oxygen with powdered coal before it emerged from the end of the burners was considered, but it was concluded that the danger of premature ignition and a possible explosion hazard precluded such a procedure. Consequently, the oxygen was introduced independently of the coal dust.

The air furnace that was employed in one series of tests was an acid reverberatory type having a capacity of approximately 15 tons. The burner port construction consisted of two adjacent burners at the end, positioned at an angle of about 25 degrees with the horizontal. Pulverized coal was delivered to the burners from a central pulverizing system. The walls of the furnace were of neutral fire brick, the bottom of silica sand.

Test procedure

Typical procedure with oxygen in this air furnace normally producing 15 tons of metal during a normal 5 hours melting cycle (measured from charge to tap) was as follows:

Starting with a cold furnace, the charge consisted of 40 per cent sprues, 15 per cent malleable and steel iron scrap. Pig iron and pig iron scrap constituted the balance of the charge. Pulverized coal was introduced through two burners at a rate of about 2000 pounds per hour. Oxygen was introduced through an independent water-cooled lance at pressures varying from approximately 10 psi to 30 psi, which represents from 1 to 4 per cent enrichment. The oxygen flow rate was, therefore, varied during the heating cycle.

The degree of enrichment was contingent upon the coal input rate, flame condition, furnace temperature, and the temperature of the charge during melting. The oxygen volumes were computed by conversion of the trailer pressure to volumetric flow rates. Except for the purpose of investigating the effect of adding pure oxygen in excess of 4 per cent, the enrichment tests were conducted using oxygen in quantities of less than this figure. It should be emphasized that when oxygen is used in excess of 4 per cent, economic as well as purely technical aspects of combustion must be considered.

In the application of oxygen during the primary ignition period, a slightly oxidizing flame was maintained. This was gradually converted to a slightly reducing flame as the heating progressed.

The method used to determine the efficacy of oxygen as a combustion accelerant was to observe changes in the characteristic color of the flame during adjustment of the oxygen flow rate. It is recognized that

the flame temperature largely determines the temperature gradient and hence the character and efficiency of heat transfer. Consequently, when using oxygen the characteristic flame is clear and blue and becomes shorter and hotter. Its emergent velocity is increased, thus accelerating the rate of heat transfer to the unmelted scrap in the furnace. This type of flame has, therefore, much more radiating and heat transfer capacity than the normal long, billowing, luminous flame obtained with coal dust and air alone.

During most of the tests the flame enrichment period was started shortly after charging was completed and was extended throughout the melting period until the scrap was melted flat in the furnace. Usually after the scrap had reached the point of incipient fusion the coal input was proportionally increased. This resulted in more complete combustion of the fuel, thus reducing the available free oxygen and preventing excessive oxidation of the iron in the scrap. Also during melting, the flame was adjusted so that it impinged on the surface of the scrap. Flame extended beyond #1 door.

The use of oxygen as an aid to combustion of pulverized coal fuel in an air furnace has promoted the following advantages over normal practice:

1. Melting rate is accelerated.
2. Total fuel consumption (amount of fuel per pound of metal processed) is decreased.
3. Relative increase in productivity is obtained.
4. Control of metal bath temperature is more positive, making it possible to tap heats at consistently the same temperature.
5. There is some indication that it causes decrease in excessive oxidation of the readily oxidizable elements such as silicon and manganese, due to a lesser amount of excess air required, more complete utilization of the available oxygen to promote complete combustion, and a more rapid temperature increase of the metal during the early stages of melting resulting in higher recoveries of alloys.
6. Slight increase in slag and metal fluidity is obtained.

Control of chemistry

One of the time-consuming phases of the malleable air furnace production operation is adjusting the metal bath composition to conform with the desired final analysis of the iron. Generally after completion of the meltdown period, test sprues are poured to determine analysis of the metal. According to established normal practice in one shop, if the manganese, silicon and carbon are on the "high side" an oxidizing condition is maintained in the furnace until an adjustment in analysis is made.

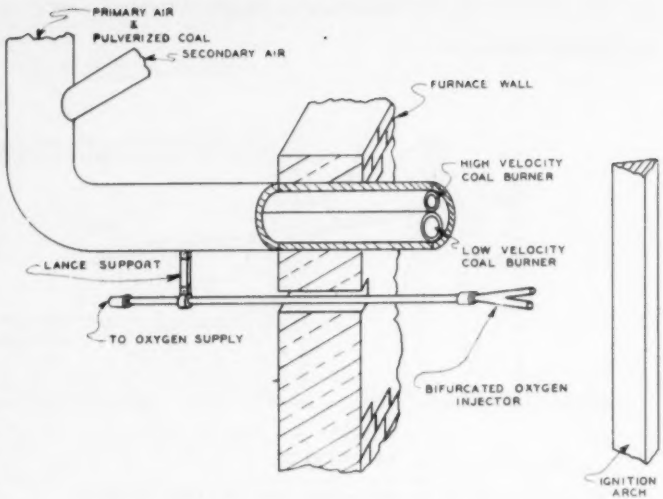


Fig. 5 . . . Independent oxygen lance proved too dangerous and was discarded.

Additives

Usually in conjunction with this oxidizing condition, iron ore is added to the bath to effect a faster rate of removal of silicon and manganese. If the adjustment is comparatively small, steel scrap is added to the bath, thus accomplishing this refinement in bath composition by dilution. This procedure is, at best, time consuming, and generally produces inconsistent results because of the inherent lack of adequate control of the oxidizing reaction.

It has been determined experimentally that a process improvement resulting in more positive control of the oxidation of these residual elements is obtained through the use of the oxygen injection method. If a bath condition exists such that the residual elements silicon, manganese, and carbon are in excess of that required to meet specifications, oxygen is injected on the surface of the bath for a predetermined period. Actual injection is accomplished by directing a stream of oxygen on the metal surface using oxygen pressures ranging from 10 to 50 psi. The oxygen lance used for the combustion process is also adapted for use in injection. Total time of injection is usually governed by the amount of silicon and manganese or carbon that it is desired to remove, and by the temperature of the bath.

Since we can accurately postulate that the order of removal of the elements concerned is basically a function of concentration and the reaction temperature, we can therefore selectively oxidize any one or a combination of these elements by injecting oxygen during any specified period of melting or refining. Available data describing the results of this application are limited. Since test facilities and time have been restricted, no elaborate attempt has been made to carry out more complete tests at present. Plans are being formed, however.

Nevertheless, the results of a number of tests using oxygen to reduce silicon, manganese, and carbon indicate that since the metal bath responds more quickly to reaction with oxygen, a rapid bath temperature pick-up can be obtained; more positive control of the oxidizing period through selective oxidation of silicon, manganese and carbon can be effected; and a savings in heat time and a concomitant savings in fuel can be obtained. It appears, however, that the role of oxygen in this application can

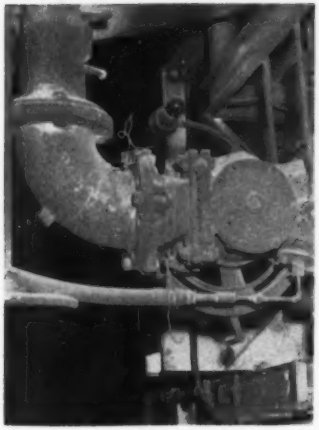


Fig. 6 . . . Photograph shows external appearance of the burner-incorporated lance sketched at right. It was the most effective of those tested in producing efficient combustion conditions.

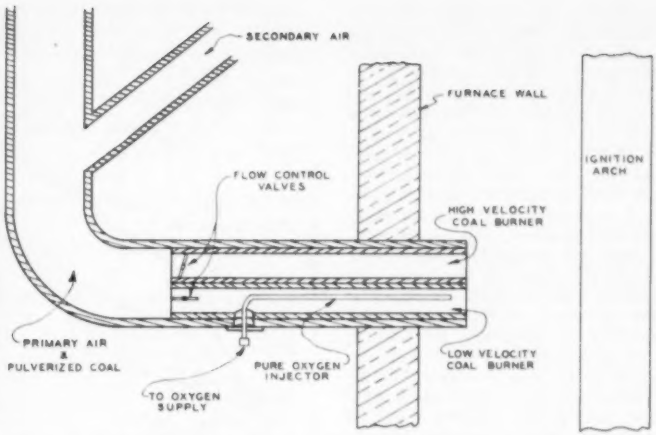


Fig. 6a . . . Lance consists of a ⅛-in. pipe brought into the coal-air duct at a point just outside the furnace and concentric to the duct. Injector pipe is lead into the center of the duct, discharging about 4 in. from discharge end of the burner. Oxygen expands uniformly on emerging from injector nozzle and thoroughly diffuses into the coal dust before its primary ignition.

be truly appraised only after a series of additional carefully controlled tests.

Annealing ovens

Tests were undertaken to determine the effect of oxygen on the thermal output of pulverized coal burners in the malleable iron annealing ovens. It was anticipated that the heating-up period would be shortened by the use of oxygen for fuel enrichment. The heating-up period is defined as "time interval between the start of the annealing cycle and the period when the castings have reached their annealing temperature, approximately 1600 F."

The theory describing the combustion mechanism of pulverized coal and oxygen has been discussed previously; therefore, the combustion principles advanced will also apply in this case, thus obviating the need for further treatment of the subject.

Results of the oxygen-enriched air-pulverized coal tests indicate that the following advantages are obtained with oxygen as compared with normal practice using air:

Primary ignition or lighting-up period is advanced more rapidly with oxygen.

Firing rate is increased, accompanied by an increase in flame temperature and flame stability with oxygen.

More complete combustion of the coal particles is obtained with oxygen. This condition prevents the formation of a low-fusing slag which has a deleterious effect on the furnace refractories. If these slag particles adhere to the boxes containing the castings and form a porous coating, the rate of heat transfer to the castings is appreciably reduced.

Because of the more efficient combustion of the coal dust with oxygen, the refractory ash formed becomes incandescent in the oxygenated flame, thus releasing an additional amount of heat by radiation to the burner area. The boxes immediately below the burner must, therefore, either be protected by using insulating materials or rearranged so that there is no direct impingement of the flame on the stacks.

An all-encompassing conclusion is that the shorter period required for ignition, the improved flame stability during the early stages of heating, and the increase in flame temperature from oxygen have resulted in a faster heating rate. This has reduced the time necessary to reach the required annealing temperature.

Type of furnace

The annealing furnace in which the tests were conducted was a periodic furnace of the conventional pot type, heated by pulverized coal and direct fired, having a capacity of 30 tons. Flue drafts on the firing end of the furnace were arranged to produce adequate circulation. Also on the firing end, 13 in. from the rear wall, was an ignition arch positioned in direct line with the burner, causing the flame to diverge as it struck the arch. The ignition arch is usually preheated prior to the start of the annealing cycle in order to facilitate combustion of the coal dust.

The annealing practice consisted of heating the castings to a temperature of 1600 F in the shortest time possible. The castings were held at 1600 F for 40 hours to allow for complete first stage graphitization. They were then cooled to 1350 F in 15 hours. During the next 25 hours they were cooled to 1275 F, at which temperature they were held for 12 hours. Following this they were rapidly cooled to just above room temperature, completing the cycle.

Equipment used

The oxygen supply, delivery, and control systems used for the annealing furnace tests were similar to those used in the air furnace tests. During the trials several injector assemblies were tested to determine which design would produce optimum firing rates and provide the most satisfactory combustion conditions.

One injector consisted of a bifurcated tube designed for high pressure flow. This injector was positioned below the burner, discharging oxygen just at the point of ignition of the fuel-air mixture on either side of the ignition column, as shown

in Fig. 5. Since it was difficult to predict the performance of the injector in this particular application, the location of the injector nozzle was arbitrarily chosen as a point just in advance of the powdered coal stream at the point of ignition of the coal dust (or perhaps more correctly, as a point where secondary combustion of the volatile gases and unburned dust particles takes place). However, the many difficulties emanating from basic design, relative position of the jet in the system, and the danger of directing the hot flame on the ignition arch resulted in discarding this design.

A second design consisted merely of a ⅛-in. pipe brought into the coal-air duct at a point just outside the furnace and concentric to the duct. This injector pipe was led into the center of the duct with its discharge end about 4 in. from the discharge end of the burner as shown in Fig. 6a. In this design, the oxygen expands uniformly as it emerges from the nozzle of the injector and diffuses into the coal dust prior to its primary ignition. This design and application has been the most effective in producing efficient combustion conditions.

Oxygen flow

In these tests the oxygen flow was begun simultaneously with the lighting-up operation. The oxygen pressures were varied from 5 to 30 psi depending upon the burning conditions. During the light-up period the oxygen flow was kept quite low in order not to defeat the purpose of the operation by cooling the undeveloped flame.

In Fig. 7 a comparison is shown between normal operation and one in which oxygen was used. In this case the bifurcated injector design shown in Fig. 5 was used. This sharp, continuous rise in the temperature curve of the oxygen operation indicates that efficient ignition is obtained almost from the beginning. On the other hand, the normal operation shows a lighting-up period of 16 hours before the temperature curve shows a steady, continuous rise. This improvement in operation persisted until the annealing temperature was reached, in spite of the fact that the oxygen was shut off at the end of eight hours. This was probably due to the heat reserve built up in the furnace refractories during the oxygen operation. This test shows that the use of oxygen could greatly improve combustion

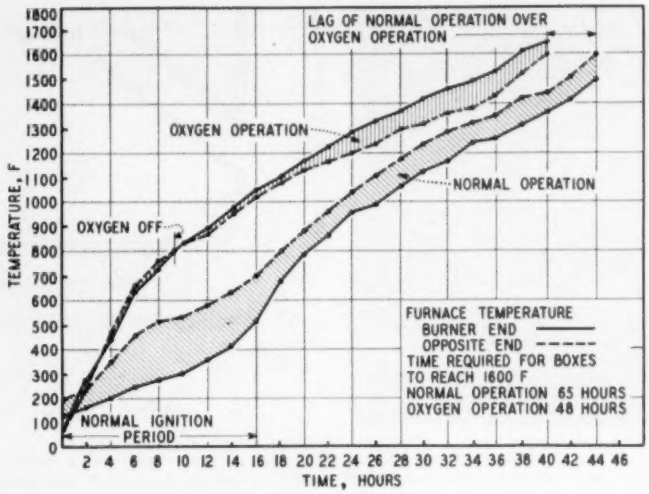


Fig. 7 . . . Comparison between normal operation and one in which oxygen was used. Bifurcated injector lance shown in Fig. 5 supplied the oxygen.

conditions during the lighting-up. However, while the oxygen did apparently reduce the lighting-up time, fluctuations in the coal feed very often caused breakdown in firing conditions. This involved loss of coal dust through crevices in the furnace wall and also caused a layer of pulverized coal to form on the annealing pots which later became caked and substantially reduced heat transfer to the castings. By maintaining more efficient combustion it is entirely possible to prevent this caking and thus make the overall annealing operation more efficient.

Why the small gradient?

It should be noted in Fig. 7 that the temperature gradient between ends of the furnace with oxygen operation was quite small, which is rather difficult to explain. The use of oxygen produces a shorter, more incandescent flame which ordinarily brings up the burner-end temperature of the furnace more rapidly. The position of the injector in this case was such that the oxygen stream did not enter the flame until it was fairly well developed. This would perhaps tend to make the overall temperature more uniform.

In Fig. 8 is shown the results of another oxygen operation compared to a typical, normal procedure. In this case the burner-incorporated injector was used. Again, a sharp ascending temperature curve is evident, but the slope appears to be somewhat steeper than in the previous test with the bifurcated injector. The rate at which the temperature of the burner end of the furnace rises meets anticipated results.

The marked decrease in heating rates when the oxygen was turned off is indicative of the efficiency of oxygen when used in the application. This steep temperature gradient between the burner end of the furnace and the opposite end (indicated by the spread between curves 1 and 2) may also be a result of the unstable flame produced by turbulence when the circulating fans are operated. This condition is particularly objectionable during the lighting-up period.

The position of the fans at either side of the burner and midway between the burner and the wall is apparently the cause of this turbulence. The direction of the motion is naturally toward the end of the furnace, but due to the proximity of the fans to the wall the motion of the atmosphere is back toward the burners. The use of one fan would be more satisfactory, as its effect would be to create a circulatory motion of the furnace atmosphere and make for a more uniform temperature gradient. It is again apparent from the curves that the oxygen-operated furnace arrived at 1600 F ten hours before the normal, controlled heat.

In all these tests, firing rates were advanced as rapidly as combustion

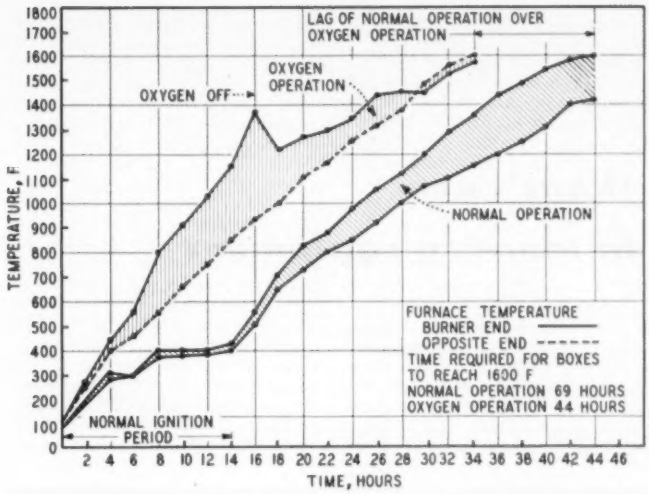


Fig. 8 . . . Another normal operation compared to an oxygen operation. Burner-incorporated injector shown in Fig. 6 and 6a was used to supply oxygen.

conditions would permit. This was accomplished by proportionate adjustments of coal delivery, oxygen, and secondary air flow rates. The ample supply of secondary air seemed to act as a vehicle for the coal particles rather than as a direct aid, and appeared to cool the flame and thus increase the spread between the front and back end of the furnace. Furthermore, the delivery of coal could not be turned up to its maximum flow because of the danger of packing in the spiral conveyor duct. When packing did occur, combustion conditions deteriorated very rapidly, and the coal flow rate had to be cut back. In this way considerable time was spent re-establishing good firing conditions, then re-advancing them to the point where they had been before packing.

Duplexing operation

Oxygen was used for improving and controlling the chemistry and output of the cupola air-furnace duplexing process. A separate, complete report is being prepared describing the operating procedure and test results governing the use of oxygen for controlled chemistry in the cupola. Therefore, a detailed discusssion of the subject will not be presented at this time. Here, however, are the results of a series of tests conducted recently in one plant.

Oxygen was used to increase the melting rate and combustion rate of the coke in the cupola. This was accomplished by introducing oxygen into the cupola in controlled amounts during specific periods of operation. The many advantages afforded by this process are: (1) ability to obtain hot metal immediately after cupola is started; (2) ability to re-establish good operating conditions almost instantaneously after a shutdown or other delays; (3) ability to maintain a uniform coke bed height throughout the operating period; (4) improved fluidity of metal due to consistently higher metal temperatures and the cleaner metal produced; (5) more uniform composition of the metal; and (6) minimum refractory damage.

Conclusions

In the analysis and interpretation of the data contained in this paper, certain assumptions regarding missing or incomplete data had to be made. Nevertheless, the various conclusions are reconcilable on the basis of comparison between existing oxygen enrichment test data and data taken from representative test heats using normal combustion methods. No attempt has been made to carry out more complete tests at present, but a systematic research program designed to provide more complete experimental data has been planned.

The authors wish to acknowledge the invaluable cooperation rendered them by Messrs. Lewis, Newbauer and Grobschmidt of the Badger Malleable Mfg. Co., South Milwaukee, Wis.

▶ A.F.S. membership tops 10,000

■ Result of a steady upward drive during the current fiscal year, the Society's membership has passed the 10,000 mark for the first time in almost three years. Largely due to the efforts of chapter membership chairmen and their committees, the Society's membership has jumped from 9,206 to 10,088 between June 30, 1951, and May 31, 1952, an overall increase of 9.2 per cent.

Most spectacular gain in membership was achieved by Central Michigan Chapter, which upped its membership from 102 to 157 members for a gain of 53.9 per cent. Second honors go to Northwestern Pennsylvania chapter with a member increase from 130 to 178 for a 36.1 per cent gain. British Columbia chapter made an outstanding showing during the year by raising its membership from 50 to 67 members, 34 per cent over its previous year's total.

Also in the running for membership honors are Quad City (up 22.1 per cent), Mexico City (20 per cent), Texas (19.6 per cent), Tennessee (18.4 per cent), Philadelphia (17.5 per cent), Metropolitan (17 per cent), and Toledo (15.3 per cent).

Of the 40 A.F.S. chapters in existance in 1951, 35 reported increases in membership. The 41st A.F.S. chapter, "Corn Belt," created last month at Omaha, does not qualify in the fiscal year totals.

Top chapter membership chairman for the fiscal year is Central Michigan chapter's Collins L. Carter, Albion Malleable Iron Co., Albion, Mich., Vice-President Elect of A.F.S., who achieved a 53.9 per cent membership gain.

foundry show

What's new in foundry equipment

■ In this concluding commentary on new foundry ideas displayed at the International Foundry Congress, AMERICAN FOUNDRYMAN completes the report started in the June issue. Foundry Congress and Show observers reporting this month are: John A. Mescher, Unitcast Corp., Toledo, Ohio; Eric Welander, John Deere Malleable Works, Moline, Ill.; Dean Van Order, Burnside Steel Foundry Co., Chicago; and the AMERICAN FOUNDRYMAN editorial staff.

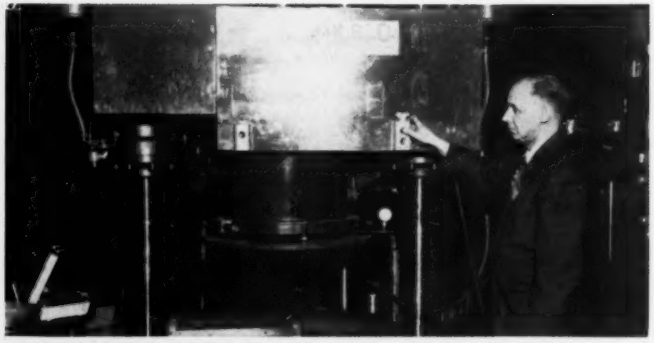
Core making

New developments in the field of cores include a high-speed, five-station fully automatic core blower, a rotary electronic core oven, a core blowing machine especially suited to tall cores, a small blower for vertically parted core boxes, a pulsating blower for use with wooden boxes, a rapid drying core paste, and a new liquid sand conditioner.

The fully automatic core blower blows a box (up to 25 x 36 in.) a minute with a draw up to 10 in. In production, the following operations are going on at the five stations of the indexing table: (1) core is blown and top half of box drawn; (2) drier or core plate is applied to lower half of box; (3) box is rolled over and core is drawn; (4) box is cleaned; (5) rods, if needed, are placed in box for the next core.

The electronic core oven with the rotating table enables a coremaker to load and unload cores at the same point without moving away from his machine. A minimum number of driers is in continuous production.

Combining blowing and squeezing, a machine for tall cores, blows, then



Pulsating core blower handles stiffest core mixtures, blows in a series of puffs which keep pressure below safe maximum. Wooden boxes are blown without splitting.

New airless blast equipment comes in two sizes, has minimum shot loss.

Electric motor on new pouring device raises, lowers ladles up to 1000 lb.

squeezes the core from the sides to increase its green strength. Cores made in this machine 18 in. and higher are handled green without damage.

An unusual small blower for vertically parted cores blows from the bottom of the box, rather than the top. Highly flexible, with quickly adjustable side, top, and end locators for boxes, this blower has been operated on a cycle of a blow each second.

The new pulsating blower for use with large wooden boxes eliminates the danger of splitting or blowing apart an improperly vented box. It operates by automatically shutting off the pressure when it reaches a maximum in the box, then blowing again after the pressure has dropped. Blows are rapidly repeated until the box is filled. Uses a single blowhole.

Sand equipment

Displays of equipment for preparing and moving sand ranged from single units to complete operating displays which took the sand through its complete cycle of foundry use. Of special interest to smaller foundries were motorized sand scoops and portable and semi-portable sand mixers. Also shown were seacoal replacements, including a material formerly used in chemically treated sand and now in easier-to-use form.

Outstanding among new equipment items for sand were a small stationary conditioning unit combined with a simplified molding hopper loader, installed without pits. Conditioner included a muller-type mixer, mixer loader, magnetic separator, and vibrating screen conveyor. Conditioned sand was moved to the hopper loader by motorized scoop. Loader consisted of skip which could be traversed to desired molding station and dumped into a molder's hopper.

A motorized sand conditioner takes sand off the floor, moistens it, removes ferrous materials magnetically, elevates, screens, aerates, and discharges in back, front, or at either side. Unusual feature is the elevator which consists of a circular channel rotating in a vertical plane. Sand is picked up at the lowest point in circle, discharged at the top.

Melting and pouring

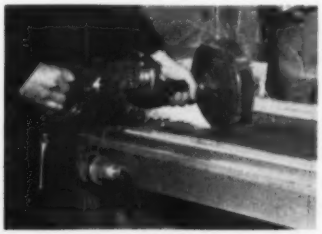
A new induction furnace, a new indirect arc furnace, and a new elec-

continued on page 90

Loading skip hoist of small-shop sand system. Skip is elevated, then traversed to the side to supply any desired number of molders up to eight or 10 with sand.

Sand conditioner elevates sand with circular channel. Unit piles or windrows.

Air placement gun for lining furnaces will sand blast with nozzle change.



High frequency, high efficiency grinder.

Small melt, flexible indirect arc furnace.

John A. Mescher

Dean Van Order

Eric Welander

Easier, surer identification with colored core sands

L. C. VOSS / *Chemist, Geigy Co., Inc., New York*
W. W. LYNN / *Metallurgist, Ohio Steel Foundry Co., Lima, Ohio*

Small additions of organic dyestuff to core sands lends a characteristic color that aids in distinguishing one sand from the other, shows undermixing, prevents the wrong distribution or mingling of sand, indicates faulty core structure, and points out uncured cores. This article tells how to add and use the dye.

■ Core room supervision can be simplified and made more accurate by creating a visual difference between sands. Instead of a name or number, a mix is given a distinctive color. By including a small amount of organic dyestuff in the formula, the type of mix will be readily distinguishable by color, and supervisors can follow it with little effort.

Definite times are set for running a sand mill before and after the liquid additions. Using color, the powdered dye is run with the other dry components. When water is added, the dye, being readily soluble, immediately gives the mix its color and will be dispersed before the binders and clays have reached the desired uniform and intimate association with the sand.

Therefore while evenly colored sand is not necessarily completely mixed, streaks of color in a batch warn that the correct milling cycle has not been followed, and that the bonds are not well distributed.

Wrong distribution

After being mixed, sand must be delivered to the proper place for use. When several sand mixes have the same general appearance this presents a problem in sorting.

Where sand is wheeled to the core room there can be no excuse for dumping different colors together. Where it is conveyed by other methods and by chance a half-empty hopper is filled with the wrong mix, the error will be noticed as the sand goes into the core.

A visual change in the sand will be apparent to the most inexperienced operator. Sand cannot be borrowed from a neighboring bench unless of the correct color. The foreman can tell by a glance around the room whether the right sand is being used in the right core.

Where a core is built of several sands, the use of color is a great aid in securing proper construction. Different colors instantly show if the right sand is being used and in the correct amounts for facings and backing, special facings for gate areas, or points subject to severe washing. Naturally any patching or joint finishing will have to be done with sand of the proper color to prevent a rejection.

Errors in core curing

Sand colors are organic substances which react to high temperatures like organic binders: on reaching a critical temperature they are converted into another chemical form, and at still higher temperatures are burned out. This critical point is not reached during the quick, low temperature cure given a synthetic resin bound core, which will remain brightly colored after curing.

With sand mixes containing cereals and oils and remaining in high-temperature ovens for long periods of time, the distinct hue given by the dye will disappear as the sand turns to its brownish cured color. Cured appearance is altered only slightly when the dye is used in the small amounts recommended but may be considerably changed if excessive amounts are added.

Temperature of the core (which determines the amount of color retained) is dependent on the temperature of the oven and the length of time of baking. This relationship is clearly shown by the test results in Table 2. Test was conducted in a recirculating, rack type, gas-fired oven on cores measuring 12 x 6 x 1½ in., made of the blue sand mix shown in Table 1. The cores at 300 and 350 F definitely had not had enough heat. The 400 F core would have been satisfactory if baking had been continued. The 450 F core was considered cured in two hours.

These figures cannot be offered as being correct for all cores in all foundries. Oven differences, special mixtures, and the degree of curing deemed suitable for specific jobs make it necessary to know the appearance of a properly cured core. Normally, sand colors cannot be used

Fig. 1 . . . Center core, showing purple sand used as facing in the dome and fillets backed up with red sand.

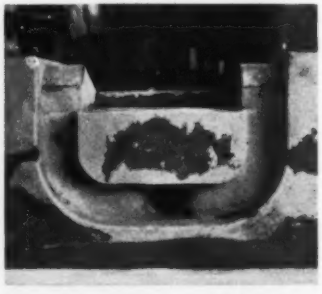


Fig. 2 . . . Gate core, showing facing in the gate area of purple sand backed up with red core sand.

TABLE 1 - COMPOSITION OF COLORED CORE SANDS

Constituent	Purple Sand	Red Sand	Blue Sand	Green Sand
New sand, lb	400	400	400	400
Silica flour, lb	150	50		100
Fire clay, lb	21			6
Bentonite, lb		2	2	4
Cereal binder, lb	4	8	2	3
Sulphite binder, lb	1			
Rosin, lb			3	
Core oil, qt	2	2.5	1	
Organic dye, tsp	1		1	1
Iron oxide, lb		4		
Moisture, %	6.0-7.0	5.5-6.5	4.0-5.0	5.5-6.5

Table 1 . . . Organic dyes must be of the proper color—purple, blue, or green.

Fig. 4 . . . Colored sands on the bench.

to prove that a core is correctly cured; but they will give visual warning of cores which are decidedly undercured.

Method of application

When working up the formula for a new mix, the smallest amount of color needed to give a distinctive shade to the batch in the muller is weighed out. When converted to the plant formula, the weight is changed to some simple measure such as one teaspoonful to a 400-lb mixture.

The amount used should be reasonably accurate. Slight differences in depth of color from batch to batch are not important as long as the hue is distinct, but wide variations may affect the appearance of the cured core. Normally between one and two ounces of color will tint a ton of sand.

Color should be added dry with the other dry ingredients of the mix so that it will be distributed with them through the sand before the liquids are added. In mixes where very little water is used, the depth of color cannot be increased by adding dye beyond the amount which will go into solution in the water present. Obviously, water-soluble colors cannot be used in mixes containing no water.

As the dye acts only as a colored, transparent solution, it will have no power to color dark mixes such as reclaimed sand containing seacoal or pitch binders. Dyestuffs are in no way similar to iron oxides, which, being pigments, will color the sand because they are opaque. Neither do dye stuffs affect core properties.

In choosing a range of colors for sand identification the hues should be kept as distinct as possible to take full advantage of the color differences. Where an iron oxide sand is used, red should be avoided except in bluish shades.

The assignment of color to special mixes should follow a definite plan so that the shade becomes associated with the functions desired by the sand. Over long periods of time the exact formula may be changed but the color will still indicate the general properties to be expected.

Where possible the color selection can take advantage of a natural association in the mind of the worker. A typical color code might include the use of purple sand for very high hot strength, red sand for high hot strength, natural sand for medium properties, blue sand for low hot strength, and green sand for very high green strength.

Other uses

Color is equally helpful in a variety of other core room operations. Colored core washes are common. In foundries where magnesium and other metals are being cast simultaneously, color is valuable to indicate the sand carrying the inhibitor; in fact, it can be mixed with the inhibitor itself so that failure to add the inhibitor will result in an uncolored and therefore unsafe sand.

By coloring a particularly expensive sand its use can be economically controlled. When not in regular use, a color may be kept on hand for addition to test runs of new binders or oils so that the one test batch may be kept separate. It may be added to remixes of old sands to be used only in less critical cores. Almost every foundry will find that color can be a very valuable aid due to its ability to create visual differences.

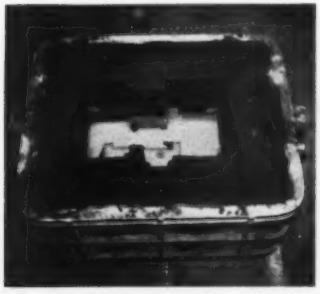


Fig. 3 . . . Showing a mold in which a special facing of green sand has been applied to a clearly defined area.

TABLE 2

Core Temp, F	Color change after time baked (hours)				
	0.5	1.0	1.5	2.0	2.5
300	A	A	A	A	A
350	A	A	A	B	B
400	B	B	B	B	C
450	C	C	D	D	D

Table 2 . . . Results of baking on the color of cores. A, distinctly blue; B, slightly bluish cast; C, trace of blue still distinguishable; D, no blue color remaining. The 450 F core was considered properly cured in two hours.

A.F.S. announces "Paris in '53"

International Congress Tour

■ An estimated 100 American Foundry executives and their wives will attend the 1953 International Foundry Congress in Paris, France, as the first official American party to visit an International in Europe since 1929. Under the slogan of "Paris in '53," A.F.S. is making arrangements for this historic event, and will coordinate the party with our French hosts, the Association Technique de Fonderie de France.

The Paris International will be held the week of September 20-27, 1953, thanks to the courtesy of the French Association, whose newly-elected President, M. Paul Muguet, recently notified A.F.S. that they had changed their International dates from May to September to accommodate the projected American tour party.

Heading the American party will be the International President, L. N. Shannon of Stockham Valves & Fittings, Inc., Birmingham, Ala., president of A.F.S. in 1940-41. Mr. Shannon presided at international activities in 1952 as International Vice-President, following the death, in March, of International President Guido Vanzetti, of Italy.

International delegates at Atlantic City assured the Society that many interesting foundry plants will be available for inspection by the American party, returning the compliment offered by U. S. foundries in conjunction with the 1952 International Study Tours, for which nearly 150 foundries expressed willingness to receive visitors. Plants in France, Belgium, Holland, England, Scotland, Germany, Switzerland and Italy are expected to greet the visitors from North America.

In all probability, two separate tours will be available, one a Pre-Congress Tour (Tour "Blue"), the other a Post-Congress Tour (Tour "Green"). The former will wind up at the Paris International before returning to the U. S., the latter will start the European itinerary at the Paris Congress. The itineraries, as now being planned, will be of approximately equal length, but will

vary somewhat in countries and places visited. Both will combine plenty of sightseeing with opportunities for plant inspections.

The tours are being arranged by A.F.S. on an all-expense basis including steamship passage across the Atlantic and return. While A.F.S. is planning the tour itineraries, and the plant inspection trips in conjunction with members of the International Committee, all physical tour arrangements (reservations, tickets, hotels, rail transportation, etc.) will be handled entirely by a constituted travel and tour agency as yet to be selected.

If possible (sailing dates not available at this writing), the tours will utilize the great new "S. S. United States" in one direction, and either the "S. S. Liberte" of the French Lines, or one of the famous "Queen" ships of the Cunard Line, in the other direction. Arrangements can be made for those desiring to fly either or both ways, on any of the many airlines, crossing the Atlantic in daily service.

Each full tour will cover approximately five weeks in Europe including a week in Paris for the International Congress, plus five or six days each way for the Atlantic crossing, depending on the ship used.

There's never been an opportunity like this for foundrymen, and there may never be again. Wonderful ships enroute . . . beautiful Europe in gorgeous Fall . . . an International Congress in the most colorful city in the world. See modern European foundries and foundry methods . . . renew friendships made in Atlantic City . . . and travel throughout with your own friends, your own people—*Foundrymen All!* It's "Paris in '53" for Foundrymen!

Now is the time to ACT! If you wish to receive all details on itineraries, costs, etc. (without obligation), *register at once* with the A.F.S. Secretary, Wm. W. Maloney, American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5.

Management's responsibility in training

Management cannot escape its responsibility for training, whether it be in a small foundry with a single supervisor who is practically indispensable for continued operation, or whether it is in a large shop with over a thousand workers and a proportionately large management and supervisory staff. The author tells why in this article based on his Educational Session talk at the 1952 International Foundry Congress.

J. D. JUDGE / *Chief Engineer, Hamilton Foundry & Machine Co., Hamilton, O.*

■ There is inherent in human nature a desire for expression. We like to advance our ideas. We feel the urge to make things, to perform some service, to fulfill some need, to accomplish some objective. We feel strongly, and at times wrongly, that our way is the best way; we often think, and frequently rightly, that we could do a given task better than it is being done. This tendency to manifest our own will is a basic motivation. Uncontrolled, such a trait leads to despotism. Intelligently directed, however, it is the basis of all freedom, it is the motivating force responsible for all world progress.

These bring success

These natural creative sentiments which we possess, coupled with the expectation of material reward, are responsible for the foundation of all business ventures. Most such enterprises are initially small. Time and talent, determine their growth and fix their span of years. If they have been wrongly conceived and poorly planned productivewise, marketwise, or profitwise, they soon wither away. If organizationally they are unsound they will eventually succumb. If, however, they are sound of product, efficient of manufacturing, astute of marketing, and enlightened of management, they will not only enjoy longevity but frequently will expand.

In any business, assuming of course a need for the product or service, leadership plays the decisive role in its success. This leadership may be embodied in an individual, who himself is one of the half-dozen workers in his plant, or it may be vested in a group which directs the activities of one of our modern industrial giants. In either event, and through all of the gradations of size and type, there is in every business some individual or some group, shouldering the responsibility of leadership; someone or some group whose duty it is to answer major questions.

We loosely classify such individuals under the general term management, although actually the formulation of matters of policy is more accurately an administrative duty, and the execution and direction of such policies a management function. Because of the characteristics of the businesses comprising our industry, particularly as to size, we shall consider top management as that individual or group actively engaged in the business and charged with the responsibility of formulating and directing the execution of matters of major policy.

In most every business today, with an enlightened top management—remember that includes the owner-worker in the small establishment—one of the matters of major policy is training! Just what is training? What is its place in industry and particularly in the foundry business?

According to Webster, to train means to educate, to form by instruction and practice, to impart proficiency, to prepare. Training for all of us begins long before we reach the age of reason. Formal training is initiated, on a general plane, in the grade school. Directionally, it is channeled somewhat in high school, particularly in the vocational and trade schools. In college, training is usually directed toward some specific objective.

When this academic phase of training has been completed —and this may occur at some period during the grade school term, or after years of college and post-graduate work—the second phase of training begins. This phase, which constitutes the continuous application of accumulated knowledge and experience, and the acquisition of skills in a particular field, is a lifetime undertaking. There are many fields of application, but we are concerned with the industrial area—specifically, foundry business.

As stated before, businesses usually start in a small way and then develop in accordance with a variety of circumstances. In the simplest type of organization there are two classifications, the owner and the workers. With some expansion, a new classification is added—supervision. Increased activity calls for another classification—clerical help; and large scale operations necessitate technical specialists. These five classifications—management, supervision, technical specialists, office or clerical, and shop workers—represent a skeletonization of the organizational constitution of most businesses. Within each of these classifications there must be planned and continuous training to succeed.

Three main objects

There are at least three important objectives for training within these classifications. The first is concerned generally with those individuals in the semi-skilled and skilled group. The aim is to help them to become more dexterous, more skillful, and to increase their over-all efficiency. These ends are achieved through a variety of on- and off-the-job formal training programs or through informal in-plant instruction.

A second objective of industrial training is directed toward those individuals who form part of the managerial hierarchy—the foremen and supervisors, the technical staff, and the junior executives. Here again the purpose is to develop individuals to enable them to become more proficient and to prepare them for the assumption of greater responsibil-

ities. The training field to be covered for this group is necessarily diverse, including such subjects as labor relations and regulations, plant policies, social legislation, time and motion study, waste prevention, industrial economics, and administrative procedures. The usual aids to these ends are extension courses, executive conferences, discussion groups, plant visitations, technical society meetings, trade magazines, etc.

The two training objectives outlined are concerned with the individual, principally because of his actual and potential contribution to the success of the business. The third objective of training differs somewhat from these in that it is concerned in large measure with the individual because of himself and society. It is universal in its purpose, applying to the laborer as well as to the executive. The aim of such training is to make the individual a better man, physically and mentally, materially and spiritually; and as a corollary to make him a better member of his community and a better citizen of his country. Since these matters lie almost exclusively in the field of human relations, the means to their accomplishment are varied. Plant letters, bulletins, and house organs, counseling service, health and hygiene programs, and company sponsored activities, are but a few.

Training then has for its purpose not only the development of abilities and skills, but a wider implication in that it is instrumental in stimulating and arousing desires for self-improvement both in the manual and the intellectual field . . . in the realm of performance and planning . . . in craftsmanship and leadership.

Why train?

All of this leads naturally to the question: Why should any business be interested in promoting the all around development of its employees? Fundamentally and basically, why should business be interested in training? The answer is not simply to make more efficient employees, so that the more economical operation resulting therefrom will be reflected in greater profit. Neither is the answer in the social benefits which accrue.

Hypothetically, if the business were to stop operating at the end of the week, would any training be necessary? If the operating period were projected to a month, would a training program be required? If the business is to continue for a year, for ten years, for 100 years, does training then become a part of the business? The answer to the latter is obviously yes. Basically then, the reason for training is to insure the continuation of the business.

Why should the continuance of any business be important? The answer for some companies, because of their nature, is clear. They have a weighty responsibility for perpetuity toward the general public. Utilities, financial institutions, and insurance companies are in this class. Many other corporations, whose stock is widely held, have a very real responsibility toward their investors. Even in the small companies, the need for a continuance of family income can be the important factor.

In addition to these primary reasons, there are also secondary reasons for the continuance of business enterprises. As we know, most businesses start on a small scale. They embody the ideals, the hopes, the desires, and the faith of an individual or a small group. Such a personal undertaking is a creative accomplishment, and as such it evokes those natural instincts of preservation. The father wants to see his sons carry on in the business to which he has given so much of himself. He wants them to taste the fruit of accomplishment; to reap the reward of hard effort. He has a justifiable pride in his business.

Although admittedly on a much less personal basis, the pride of accomplishment also exists in the larger organizations, even among those individuals who have come into established businesses. It's natural for a person to want to see the continuation of a concern which has incorporated in it many of his ideas, so much of his time and effort.

Personnel considerations

A third consideration for the continuation of any established business is the personnel of the plant. There are many employees who build their lives around their job. They establish their homes, raise their families, predicate their hopes, their aspirations, on the security of their employment. These human considerations cannot be ignored.

Conferences between top management and younger supervisors, whether the plant is large or small, are part of the training which is management's responsibility.

Having reviewed some of the reasons prompting the initiation of a business . . . defined top management . . . sketched the organizational make-up of business . . . and the objectives and reason for training . . . we are ready to consider the responsibilities of top management.

Training begins in grade school, is given direction in high school, and attains objectivity in college. It follows that top management should evidence a real and an active interest in the high schools, particularly in the trade and vocational schools. Supplying part-time instructors and equipment for shop courses, promoting plant visitations, providing after-school and summer work, and encouraging personal consultations, are but a few of the means of evidencing interest. There is a profound convic-

tion on the part of many foundrymen that the high school level provides the most promising area for stirring the imagination, awakening an interest, providing a challenge, and stimulating a desire in young men for the foundry business. Most of these students are undecided as to their future plans. Far too many of these young men leave high school with only the haziest kind of a notion of the foundry business, with no idea of its operation, its vital place in industry, or its opportunities.

At the college level, top management is provided with a unique, well-organized program in the

Plant visitations, technical society meetings, extension courses, along with executive conferences are training aids management should use and encourage.

Foundry Educational Foundation, which needs only its continued, active support to successfully carry on its outstanding work. The Foundation has been responsible for reactivation and reorientation of lecture and laboratory courses in foundry and allied subjects in many universities and colleges. This, together with the cooperative and summer work provided by the member foundries, has resulted and will continue to result in a pool of young engineers with both academic training and practical experience in the foundry business—young men from whose ranks should come the managers of tomorrow.

Pass on knowledge

Practically all knowledge that we possess has come to us from others, consequently in simple justice we all have a responsibility to pass on that which we have inherited. Over a period of years this has proven to be not only ethically sound, but also good business.

Efficient and profitable operation depends upon the maintenance of an organization skilled not only in general fundamentals but also trained in details peculiar to a specific organization. This applies not only to manual operations, but also to all other functions of the business. Top management, accordingly, has the definite responsibility of formulating policies and delegating or directing their execution so that this basic objective of instructing others in all aspects of the business will be accomplished.

Labor turnover occurs in every business. Top management is familiar with this fact and, again, it is its duty to formulate general policies relative to this problem, particularly as it applies to the semi-skilled and skilled employees. The objective is, through proper training in all its implications, to reduce turnover, or to assure that when it does occur the effect on efficiency of the business will be a minimum.

Top management should be much more directly concerned with those positions in the organization of greater responsibility—the foremen, the supervisors, the technical and sales personnel, and the executive positions. Management has the responsibility of facing the facts of life, of realizing that key personnel are constantly attracted by better opportunities, real or fancied, in other organizations; of recognizing that accidents, ill-health, retirement, and death pay their inexorable visits with impartial regularity to all. Available statistics provide management with a guide in these matters.

There is no greater responsibility for management than to plan for upgrading and replacements in the managerial hierarchy. Training should be fashioned not only to care for the unexpected contingency, but to prepare for the one, the five, the ten-year future. To this latter end, recruitment of young men is essential. They should be men of vigor and enthusiasm, men with fresh and modern conceptions of materials, of methods, and of men; men who can be trained in the ways of the organization; who can be a force in overcoming any tendency toward stagnation. In short, men who can keep the business young mentally.

Management, therefor, in order to insure the continued efficient operation of the business, must formulate a policy of planned development of skills and abilities at all levels within the organization, and must intelligently approach the problem of personnel upgrading and replacement. Essential though they are, these policies to be fully effective must be augmented—they must be coordinated in human relations.

It has been said that industry is a social as well as an economic phenomenon. It is made up of individuals who must earn their daily bread, but who in addition have ideas, beliefs, and convictions . . . desires, hopes, and plans. These aspirations, these cravings, these needs must be recognized and must be satisfied to some extent, if an approach to personal peace and contentment is to be attained and reflected in organizational cooperation, efficiency, and success.

Enlightened management can go far toward the discharge of this responsibility through sincerity and understanding. Frank, unbiased explanations and discussions—of union negotiations, of pension and retirement funds, of health and accident insurance, of profit sharing, of incentive plans, of safety and hygiene, of community projects, of national issues, in short, of any major plant policy or outside occurrence which intimately affects the employees or the company—are educational and instructive, and are practical training of the mind.

Now to evaluate the responsibilities of top management in training

as they relate to the foundry industry. As of October 1951 there were 5299 foundries of all types in this country. (Marketing Guide, Penton Publishing Co.). Eighty per cent of them employ less than 100 men.

But training is essential in any business, regardless of size, if it is to continue on a profitable basis. Consider the small foundry with one supervisor. Such an individual has a diversity of duties. He must oversee the melting and molding, the coremaking and cleaning, the shipping and storage. He is practically indispensable for the continued operation of the business. Training of a replacement for such a man is imperative.

Most larger foundries recognize the need for training and have such programs. There exists, however, in some instances a complacency in regard to supervisory and managerial replacements which is hazardous for the organization. As an example, top management of many foundries in an endeavor to further the educational advantages of its supervisory force, frequently sends groups to various types of meetings. Does top management ever consider the effect on the business if group disaster should overtake such a trip? Does the training program provide for understudies suitably prepared for advancement?

Another aspect of the training problem which should be briefly considered is the matter of obtaining replacements from the field rather than from within the organization. There is no company which has not at times engaged in such practice, either purposely or through necessity. Such procedure is justified at times on the basis of limited capabilities within the organization, of outmoded outlook due to organizational inbreeding, of inordinate depletion of personnel, of unforeseen expansion, or major procedural changes.

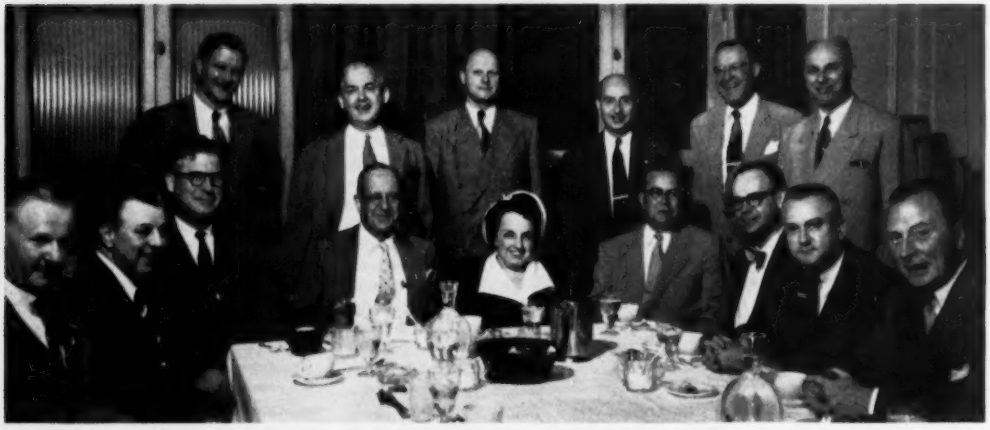
Determining the extent to which such practice should be followed, in order to maintain the proper balance of morale within the organization, is one of the more delicate responsibilities of judgment for top management. Regardless of the extent to which this policy is pursued, management cannot by this means honestly escape the responsibility of training. We are dependent beings. We need one another. Inordinate selfishness should have no place in our organizational thinking. Management should feel that if trained personnel are obtained from the industry, management has, in turn, the obligation to train others.

This axiom that anything which benefits the industry as a whole will also result in a benefit to the individual members needs constant emphasis.

It is a firm belief in this truth which should prompt top management to look beyond the immediate returns to support the Foundry Educational Foundation, technical and trade societies, research projects, and other undertakings of general benefit.

The foundry industry, even with its preponderance of small units, employs roughly a half million people who produce annually more than 22 million tons of castings. These castings are the very foundation of our industrial structure. Upon them is built in large measure all other industry. Truly we can be proud of our contribution to the progress of our country and the world. Equally true is the realization that we must recognize the tremendous responsibility which rests upon the industry for the continuance of such progress and the responsibility which rests upon top management within the industry for such continued contribution through training.

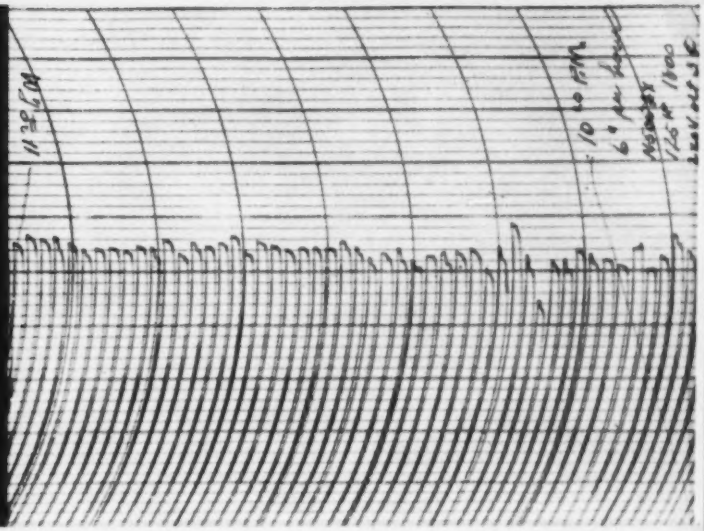
▶ *Exhibitors committee holds convention post mortem*



The 1952 Exhibits Committee met in Chicago June 6 to review the recent Foundry Congress and Show and to discuss the 1954 Show. Seated, left to right, are: Russ Matthews, Bakelite Div., Union Carbide & Carbon Corp., New York; A. A. Hilbron, A.F.S. Convention & Exhibits manager; L. L. Andrus, American Wheelabrator & Equipment Corp., Mishawaka, Ind.; A.F.S. President Walter L. Seelbach, Superior Foundry, Inc., Cleveland, presiding; Terry Koeller, *American Foundryman* advertising manager; V. F. Stine, Pangborn Corp., Hagerstown, Md.; H. F. Scobie, *American Foundryman* editor; R. G. Kaveny, Herman Pneumatic Machine Co., Pittsburgh; and Vice-President Elect Collins L. Carter, Albion Malleable Iron Co., Albion, Mich. Standing, left to right, are: William N. Davis, A.F.S. Safety & Hygiene & Air Pollution director; Secretary-Treasurer Wm. W. Maloney; R. L. McIlvaine, National Engineering Co., Chicago; C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago; Wm. L. Hartley, Link-Belt Co., Philadelphia; and S. C. Massari, A.F.S. technical director.

An actual record of one hour's operation of a typical manually controlled Model "80" Speedmullor. Fifty 1-ton batches of synthetic molding sand were loaded, mulled to maximum physical properties, and discharged in this period.

Batch after Batch...



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WITH A SPEEDMULLOR

Only in the Speedmullor are accurate control and complete mulling of batch type operation combined with the advantages of high-speed mulling. Other mullers may claim fast time cycles although they were designed for 5 or 10 minute operation, but only the Speedmullor was designed and built to provide high-speed, thorough mulling. For maximum development of physical properties, total Speedmullor time cycles vary from 1 to 1½ minutes depending on the type of sand mulled. Thus, batch after batch of completely mulled sand is discharged so fast that practically a continuous supply of sand is available for high production foundry molding and core making.

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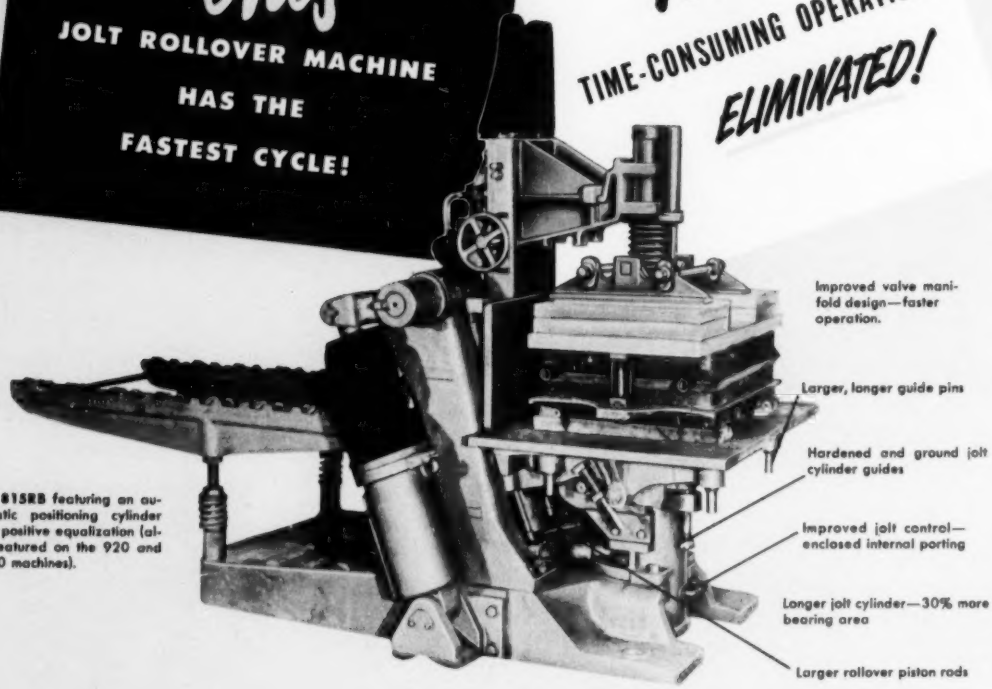
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The 815RB featuring an automatic positioning cylinder and positive equalization (also featured on the 920 and 1020 machines).

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Jolt Rollover Pattern-Draw Machines

Model	Table Size	Pattern Draw	Capacity
612	24"x30"	12"	600#
815	30"x40"	15"	1200#
920	44"x54"	20"	2000#
1020	50"x60"	20"	3000#

All J & J Rollovers are open end and therefore do not limit the length of flasks used.

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President's Safety Conference gives impetus to *Ten-Year S & H & AP program*

■ The need for coordinated safety measures on the part of all industry is vital to the defense effort, according to President Truman, speaking at the President's Conference on Industrial Safety, June 2. The Conference, held in Washington, was reported by William N. Davis, director of the A.F.S. Safety & Hygiene & Air Pollution Program.

This was third such annual conference called by the President in an effort to stem a rising tide of industrial accidents. In attendance were top officials of the Department of Labor, industrial management, safety and personnel representatives, educators and representatives of the nation's major technical and trade organizations.

President Truman spoke at the opening session of the three-day Conference the morning of June 2.

"At my first meeting in 1949, I proposed that we try to reduce the rate of job accidents by one-half within three years," the President said, "and until the outbreak of hostilities in Korea, we were making good progress.

"Then," he continued, "due to our defense program thousands of new workers were brought into industry . . . the number of work accidents began to increase, by 4 per cent in 1950, and another 9 per cent in 1951. This increase is a very serious matter and we must do everything we can to stop it. We must see that the accident rate starts downhill again, and that it keeps going down.

"Last year work accidents took 16,000 lives," the President continued. "In addition, 16,000 workers were totally disabled and more than 89,000 partially disabled . . . they point to a shocking national tragedy —a tragedy all the more terrible because it is so unnecessary.

"There are a lot of things to be done, and there are a lot of things being accomplished. Private groups have been doing a good job in discovering better methods of accident control. Management and labor have been cooperating more in developing safety programs and making them work," Mr. Truman added.

Safety Program

The President concluded by recommending an eight-point industrial safety improvement program.

(1) Accident reporting and analysis must be improved.

(2) Better guards must be installed on machines by manufacturers.

(3) Schools, colleges and plants must emphasize safety education.

(4) Every company should have an organized safety program.

(5) Workers must participate more in safety measures.

(6) State safety codes must be modernized and made uniform.

(7) Public employees must have better safety programs.

(8) There must be better public understanding and support of accident prevention measures.

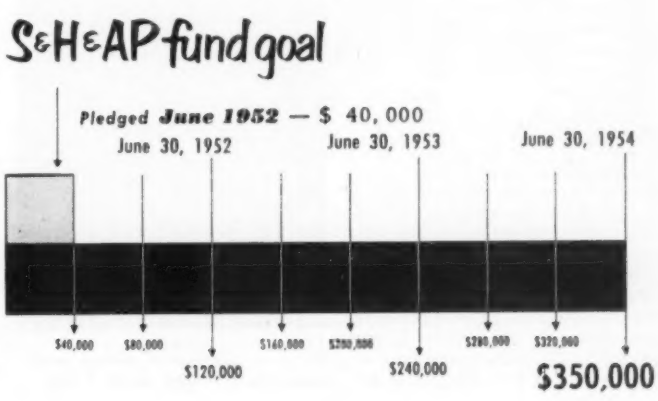
In line with the President's recommendations and those of the A.F.S. Safety & Hygiene & Air Pollution Committee, 40 West Virginia foundries last year inaugurated safety programs that have reduced industrial accidents by 50 per cent.

The outstanding safety success achieved in West Virginia is indicative of what can be done to increase safety in all foundries by developing a coordinated, industry-wide effort such as the A.F.S. Safety & Hygiene & Air Pollution Program. Such a program gives each member foundry an opportunity to add its knowledge to a pool of accurate safety information and, by the same token, to draw from that pool ideas that will promote the well-being of its workers.

A.F.S. this month has added a new service to its Safety & Hygiene & Air Pollution Program—consultation on industrial hygiene and safety problems. Foundries are invited to send their problems to William N. Davis, Safety & Hygiene & Air Pollution Program Director, American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill. There is no charge for this service.

S & H & AP Contributors June 1 to 30

Buckeye Foundry Co., Cincinnati.
Deere & Co., Moline, Ill.
Foundry Facings Manufacturers' Association, Cleveland.
Grede Foundries, Inc., Milwaukee.



How to lick poor scrap, high prices

Making a synthetic pig iron

F. C. BARBOUR / *Chief Metallurgist, McWane Cast Iron Co., Birmingham, Ala.*

This article tells how one foundry beat the squeeze of poor scrap supply and high scrap cost that beset all foundries in 1948-1949. The answer? Synthetic pig iron, made in two idle cupolas, with superior qualities at a cost $12 per ton lower than that prevailing.

■ During the latter part of 1948 and all through 1949, the price of scrap iron soared to its highest peak in history. At the same time, the grade of scrap was not conducive to uniform operation.

The author's foundry effectively combatted this situation by converting two idle cupolas to the production of a synthetic pig iron. Thousands of tons of sugar mill scrap were imported from South and Central America. Although this scrap included many heavy sections such as large rolls, it was generally soft enough to break with a drop block.

This scrap was melted with 50 per cent domestic steel scrap and poured into pig molds (Fig. 1). In the melting operation, natural lump graphite and ferrosilicon were used to raise the carbon and silicon in the end product. A special by-product coke made from a high carbon and low ash coal was used to further increase the total carbon. Iron-to-coke ratio was 8:1.

Melting details

Melting was carried out in two balanced blast cupolas lined to 64-in. ID. A forehearth (Fig. 2) was used to bring the sulphur below 0.050 per cent. After wide experiment, sodium sesquicarbonate was chosen for sulphur removal; used in its natural state, this material produced less erosion in the forehearth with equal removal properties at less cost. Determinations from the cupola and

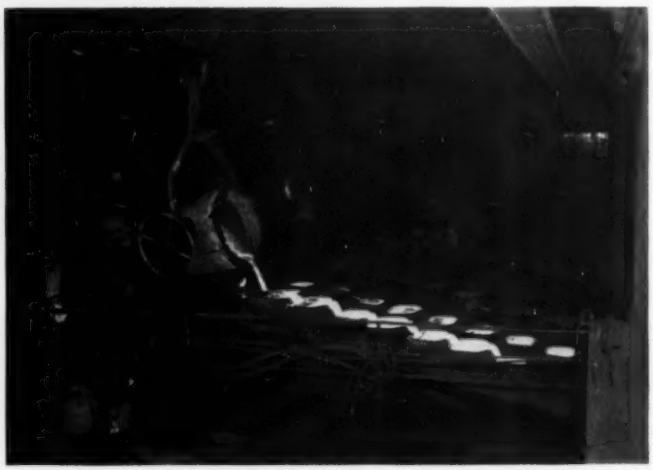


Fig. 1 . . . Cast scrap was melted with 50 per cent domestic steel scrap. Here it is being poured in pig molds. Cost was $12 under prevailing prices.

Fig. 2 . . . Forehearth, sodium sesquicarbonate cut sulphur below 0.050.

Fig. 3 . . . This steel casting being charged weighed 15,200 pounds.

forehearth yielded the proper amount of desulphurizer, which was only changed when sulphur in the pig iron changed.

The pig iron produced weighed 200 lb per pig and contained 1.20-1.40 per cent silicon, less than 0.050 per cent sulphur, 0.40-0.50 per cent manganese, 2.90-3.20 per cent total carbon, and 0.55-0.60 per cent phosphorus. The high phosphorus content was due to the European origin of the sugar mill scrap.

Analysis of the iron compared favorably with the grade of scrap available at the time, with the sole exception of sulphur; this was much lower in the pig iron. When the pig was remelted, it was superior to cast scrap in that its size was uniform and its chemical analysis known.

Cost averaged about $12 per ton less than the prevailing market price of cast scrap. The economy was due to the comparatively low cost of domestic steel scrap and a minimum of labor. In all, over 25,000 tons of synthetic pig iron was produced in this fashion.

Melting large pieces

Left over were several hundred tons of cast scrap that could not be broken and large steel castings that could not be cut economically. Some were large sugar mill rolls that contained too much steel to break. As these large pieces were not wanted by scrap dealers, it was decided to try to melt some of the relatively smaller ones in the cupola.

As the operation progressed, larger pieces were added to the charge at intervals. Soon it became evident that the size of material was limited only by the inner diameter of the cupola itself. Refractory consumption was higher, as the additional heat required was harder on refractory life.

All the large sections were melted with regular foundry coke, with an iron-to-coke ratio of 8:1. Small material was charged for about 30 minutes at the beginning and end of each heat. A small amount was charged throughout the heat to keep the flow of molten iron constant.

An operation of this type provides excellent opportunities for experimentation in the melting process. Oxygen enrichment, carbon absorption, ladle additions, and the effect of various elements on carbon content are but a few of the factors that can be investigated. In addition, it is an excellent proving ground for comparative tests on various refractory materials.

Fig. 4 . . . All long rolls were placed on end and melted in this manner.

Fig. 5 . . . With steel center shaft removed, roll weighed 14,000 pounds.

▶ *MFS holds annual meeting*

■ Business and social events played equally prominent roles at the annual meeting of the Malleable Founders' Society, held at Hot Springs, Va., June 16-17.

Top events on the two-day agenda included election of officers, an annual banquet, a golf tournament, presentation of the Society's McCrea Award, and presentation of reports and plans by organization officials.

Frank D. Brisse, president, Laconia Malleable Iron Co., Laconia, N. H., was elected president of MFS for the current year and George T. Boli, Northern Malleable Iron Co., St. Paul, Minn., was elected vice-president. Secretary-Managing Director L. D. Ryan was reelected.

Year's top honor for "outstanding service to the malleable castings industry," the McCrea Medal, went to Ralph N. Cole, president, Canton Malleable Iron Co., Canton, Ohio, designer of the Whiting-Cole annealing oven. Mr. Cole has given freely of his time for several years as a consultant to NRA, OPA and, currently, OPS in an effort to assist the government in malleable casting problems. He is past president of the Society, heads its Cost Committee.

Photographed on the steps of the Homestead, Hot Springs, Va., during the Malleable Founders' Society Annual Meeting, June 16-17, were, front row left to right: James H. Lansing, Retiring MFS President Cal C. Chambers, Incoming President F. D. Brisse, George T. Boli, and A. F. Jackson. Second Row: W. H. Moriarty, C. E. Brust, R. N. Hoffman, C. M. Lewis. Third row: M. Traum, W. S. Roby, Lowell D. Ryan, C. I. DeShong, Carl F. LaMarche, and R. L. Gilmore.

Record overseas attendance at 1952 Foundry Congress & Show

■ More than 300 prominent foundrymen from 31 nations, exclusive of Canada, Mexico and the United States, established an all-time record for overseas attendance at the 1952 A.F.S. International Foundry Congress & Show, held May 1 through 7 in Atlantic City, N. J.

Numerically, the British delegation was the strongest, with 52 foundrymen from England and Scotland. Closely following in attendance were Germany with 39 delegates, France with 38, and Italy with 30.

Top honors in distance traveled to the Foundry Congress went to five foundrymen from Australia, who flew upwards of 10,000 airline miles to attend. Also in line for the long-distance record were foundrymen from India, Formosa, the Phillipines, Japan and South Africa, all of whom traveled more than 6,000 miles to the Congress.

Eleven nations sent official delegates from their foundry technical associations to the International Foundry Congress—Belgium, Denmark, France, Great Britain, Germany, Italy, India, Netherlands, Norway, Sweden, and Switzerland. For the most part, the delegates were high officials of their respective organizations.

Also present at the 1952 International were more than 300 Canadian and five Mexican foundrymen, who were not regarded as international visitors at the Congress, but as an integral part of the Society's North American network of 41 chapters.

Majority of the overseas visitors participated in two month-long study tours of United States foundries, so arranged as to include the 1952 International Foundry Congress & Show on their itineraries. The two tours, arranged by A.F.S. in collaboration with the Mutual Security Agency and Thos. Cook & Sons travel agency, both arrived in New York on April 18 by ship from England, and departed May 14. Study Tour "Red" visited foundries in New York, Cleveland, Chicago, and Cincinnati. Study Tour "Blue" visited foundries in New York, Buffalo, Detroit, Chicago and Pittsburgh. In each of these cities, with the exception of Pittsburgh, where the overseas foundrymen were entertained by the Pittsburgh Foundrymen's Association, local A.F.S. chapters planned plant visits and entertained the visitors.

Of particular interest to international visitors at the Congress were the International Reception for overseas visitors on Sunday, May 4, and the International Education Dinner on Tuesday, May 6.

Overseas visitors

Argentina

Carlos A. Breuer, Beichhold Quinica, Buenos Aires.

Australia

F. J. Bradley, Gibson Battle, Ltd., Sydney.
Alexander Carmichael, Alexander Carmichael Pty. Ltd., Sydney.
Victor W. Newbold, Newbold General Refractories Ltd., Newcastle.
A. F. Shroder, Ford Motor Co. of Australia, Geelong.
H. A. Stephens, Commonwealth Scientific Industrial Research, Melbourne.

Austria

Josef Aschauer, Gustav Weiss, Vienna.
Johann Besenkopf, Franz Zimmermann & Soehne, Vinnea.
Wilhelm Doerfler, Alois Rittmann's Nachfolger, Goess-near-Leoben.
Joseph Fischauer, Eisengiesserei Jng. Gustav Weiss, Vienna.
Oskar Frohlich, Austrian Productivity Center, Vienna.
Oskar Theodor Goehring, Rudof Geburth's Erben, Vienna.
Alexander Grezner, Alpine Mountain, Donawitz-Leoben.
Max Kraus, Kolben-Kraus, Vienna.
Josef Hausmann, Vereinigte Wiener, Metallwerke A. G., Vienna.
Alois Miksche, Dr. R. Lang, Vienna.
Georg Schmid, M. Schmid & Soehne, Wilhemsburg.
Bruno Tarmann, Gebrueder Boehler & Co., Styria.
Wilhelm Pohl, Machine Factory, Andritz.
Alois Anton Thomas, Vereinigte Eisen u., Linz.
Heinz Vogelsinger, Vogelsinger, Vienna.
Herbert Zirl, Iron Foundry H. Zirl, Graz.

South of the Border foundrymen at the International Reception. From left: Guillermo Sarmiento, Bogota, Colombia; Dr. Miguel Siegel, Sao Paolo, Brazil; N. S. Covacevich of Mexico City; and Urbano Lopez Ayala of Aire Libre, Mexico.

Robert Crigniez of Belgium responds on behalf of overseas visitors to President Seelbach's address of welcome during the Society's Annual Business Meeting at the Foundry Congress.

Belgium

M. A. De Bock, Brussels.
Gustave Boel, Usines Gustave Boel, La Louviere.
Pol. G. Boel, Usines G. Boel, La Louviere.
Robert Crignier, Forges et Fonderies Remy, Brussels.
G. Halbart, Association Technique de Fonderie de Belgique, Brussels.
Julien Dewez, Usines Emile Henricot, Etienne.
Michel Malacort, Ateliers Houget, Hevsy-Verviers.
Andre Dawans, Matthiew & Fonderies Porto, Huy.
Robert Doat, Cie, General des Conduites, d'Eau, Liege.
F. Gaty, University of Liege, Liege.
James Ortmans, Belge de Fonderie Sa-a, Levoltrahegnies.
Georges Egide Vanderheyden, J. Metten Grivegnee Liege, Liege.

Brazil

Miguel Siegel, Eisa Ltd., Sao Paulo.
A. J. A Teixeira, Mercantil Comeccio Industria SA.
Murilo De Oliveira Marcondes, Ind. Metal Aparecida, Sao Paulo.

Chile

A. S. Neuburger, Copialoo.

China (Formosa)

Yushu Kao, Taipeh Iron Works Ltd., Taipeh.
H. T. Tsai, 61st Arsenal Chinese Nationalist Army, Taipei.

Colombia

Guillermo Sarmiento, Productos Industriales, Bogota.
Affonso Muvos, Productos Industriales.

Cuba

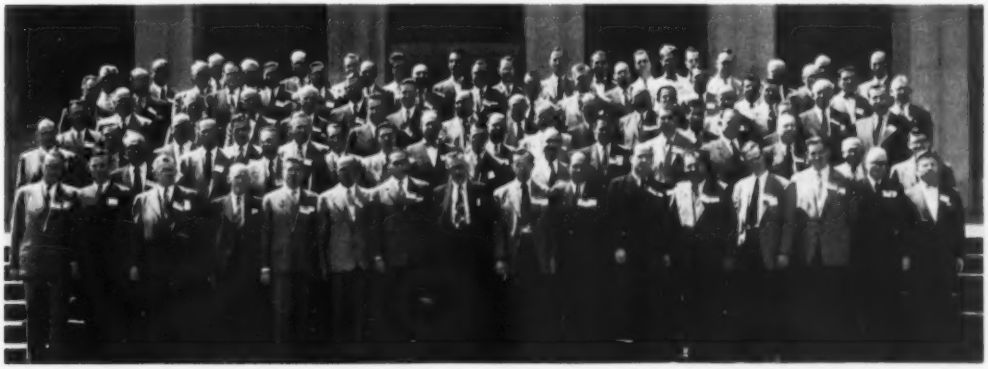
Francisca V. Alsina, Lamparas Quesada Industrial S.A., Havana.
Idefonso Quesada, Lamparas Quesada Industrial S.A., Havana.

Denmark

Erick Johan Hagen, Johan Jensen & Son, Vesterbrogade.
Ove Hoegh-Guldberg Hoff, Denmark Institute of Technology, Copenhagen.
Jursen Heinrich Jacobsen, A/S H. Rasmussen & Co., Odense.
Harald Leonhard Jochumsen, A/S Atlas, Copenhagen.
Allan Peter Wilhelm Koch, Divilengineer V, Copenhagen.
Ole Brings Nielsen, Rosenkilde Foundry, Gorlose.
Viggo Pedersen, Midtfyns Jernstoberi A/S, Ringe.
Elith Henry Glavind Rasmussen, A/S Holbaek Jernstoberi, Holbaek.
Niels Rasmussen, Lineta, Copenhagen.
Larsen Hans Adolph Stjornholm, Iron Fdy. "Dania" Ltd., Aarhus.
Johan Frederik Volk, Leder AF Burmeister & Wain's, Holte.

England

Alfred Augstein, Foundry Suppliers Ltd., London.
Douglas H. Armitage, British Steel Founders Assn., Sheffield.
John Bailes, William Jessop & Sons, Ltd., Sheffield.
Kenneth Ernest Batty, P. C. Fascotte, Darton.
W. L. Beasley, James Bridge Steel Works, Wednesbury.
John Bolton, Steel Founders Assn., Sheffield.
Lawrence Brown, Premo Pattern Co., Ltd., Birmingham.
J. N. Burns, British Bath Co., Middlesex.
Francis George Butters, Bamford Ltd., Staffs.
C. L. Clarke, Brown & Polson Ltd., London.
F. Clymer, F. Lloyd & Co., Wednesbury.
D. A. Crooks, Ashmore, Benson & Pease, Stockton.
J. Dawson, Ferranti, Ltd., Hollinwood.
Vincent Delport, Penton Publishing Co., Ltd., London.
E. F. Emley, Magnesium Elektron Ltd., Manchester.
A. B. Everest, The Mond Nickel Co., Ltd., London.
P. A. Fisher, Magnesium Elektron Ltd., Manchester.
H. M. Garner, Magnesium Elektron, London.
G. L. Hancock, The David Brown Companies, Penistone.
R. Laroux Handley, Ferranti Ltd., Hollinwood.
D. B. Hosie, The Morgan Crucible Co., Ltd., London.
J. Raymond Jones, Richard Thomas & Baldwins Ltd., Swansea.
Brigadier A. Levesley, Edgar Allen & Co., Ltd., Sheffield.
C. A. Lindop, H. W. Lindop & Son Ltd., Willenhall.
D. C. Lindop, H & J Hill, Willenhall.



Overseas foundrymen, members of one of two concurrent study tours of U.S. foundries here during April, shown on the steps of Cincinnati Milling Machine Co.'s Engineering and Service Building while visiting foundries in that city. Arrangements were made by the A.F.S. Cincinnati District Chapter on Wednesday, April 30.

Ladies from many lands were honored guests at the International Foundry Congress. Representing the British Empire at the Ladies Tea & Reception on Friday, May 2, were, left to right: Mrs. C. L. Clarke of London, England; Mrs. A. M. Wilson of Paisley, Scotland, and Mrs. Alexander Carmichael of Sydney, Australia.

England (cont'd.)

Tom Makemson, Institute of British Foundrymen, Manchester.
R. A. Miller, Foundry Services Ltd., Birmingham.
Henton Morrogh, British Cast Iron Research Assn., Birmingham.
Alfred John Murphy, Univ. of Birmingham, Birmingham.
Noel P. Newman, Newman, Hender & Co., Ltd., Gloucester.
Walter Brian Parkes, British Cast Iron Research Association, Birmingham.
F. Perks, F. H. Lloyd & Co., Wednesbury.
William Rawlinson, J. W Jackman Co., Ltd., Manchester.
L. W. Rodway, Monsanto Chemical Ltd., London.
F. W. Rowe, K & L Steelfounders & Engineers Ltd., Letchworth.
Arthur A. Rowse, Langley Alloys Ltd., Langley.
Philip A. Russell, S. Russell & Sons Ltd., Leicester.
John J. Sheehan, Coneygre Foundry Ltd., Tipton.
John Skinner, Howard & Bullough Ltd. Accrington.
W. Thomson, Fdy. Supplies, Ltd., Leicester.
Eric Weiss, Foundry Services Ltd., Birmingham.
A. M. Wilson, Corn Products Co., Ltd., Paisley.
S. C. Worley, William King Ltd., Birmingham.
A. Young, Allied Iron Founders Ltd., Greenford.

Finland

Erkki Kreula, Helsinki.

France

Marcel Ballay, Centre d'Information Du Nickel, Paris.
Paul Blanchard, Legenisel & Blanchard Steel Works, Paris.
Robert Henri Blanchard, Ste. des Fonderies de Pont-a-Mousson a Foug, Meurthe-et-Moselle.
Roger Bouchaud, Fonderies de Jeumont, Paris.
Robert Boutigny, Societe Stein & Roubaix, Paris.
Emile Breysse, Ste. des Machines, Osborn.
Marie Francois Chatel, Ste. des Fonderies de Bayard & St. Dizier, Paris.
R. A. Chavy, Asnieres.
Francois Collignon, Foundries Collington Deville, Ardennes.
Pierre David, Fonderies de Pont a Mousson, Pont-A-Mousson.
Michel Ferry, Centre Technique des Industries de la Fonderie, Paris.
Raymond Gailly, Ets. Gailly Freres Charleville, Ardennes.
Andre Gillet, Fondi De Lonvoirs, Paris.
Jean Ernest Gillet, Ste. Metallurgique d' Aubrives & Villerupt a Aubrives, Ardennes.
Maurice Grandpierre, Pont a Mousson, Pont-a-Mousson.
Gaston Rene Herbays, Ste. Metallurgique d' Aubrives et Villerupt a Villerupt, Meurthe-et-Moselle.
Marcel Louis Jaques, Ste. des Fonderies de Pont-a-Mousson a Foug, Meurthe-et-Moselle.
Marcel Jaumain, des Mines Fonderies & Forges d'Alais, Tamaris.
Louis Jeanjan, Ste. des Fonderies de Bayard & St. Dizier a Bayard, Haute Marne.
Jean Leroy, Ste. Metallurgique d'Aubrives & Villerupt, Meurthe-et-Moselle.
Rene Loiseau, Association Teohnique de Fonderie, Paris.
J. Mirman, Ph. Bonvillain & Ronceray, Choisy le Roi.
Gaston Ponsart, Comite Franc-Dollar.
Rene Pierre Rabaglia, Ste. Metallurgique d'Aubrives & Villerupt, Meurthe-et-Moselle.
Gabriel Renoul, SAFE.
Robert Ronceray, Ph. Bonvillain & Ronceray, Choisy le Roi.
Roger Leon Jean Sadler, Ste. des Fonderies de Pont-a-Mousson, Meurthe-et-Moselle.
Henri Sognet, Ste. des Fonderies de Pont-a-Mousson, Meurthe-et-Moselle.
Martial Songeur, Pont a Mousson.
Yvon Tondon, Ste. des Fonderies de Pont-a-Mousson, Meurthe-et-Moselle.
Georges Ulmer, Centre Technique de Industries de la Fonderies, Neuilly-Sur-Sein.
Andre Varin, Ste. Des Cheneaux.
Antoine Mauriee Viallon, Hirson Steel Casting Co., Hirson.
Jean Robert Vigneau, Ste. Miniere et Metallurgique de Perigord a Fumel, Lot-&-Garonne.
Gunter von Meretta, Saar-Metallwerke, Saarbrucken.
Georges Vuillien, Pont-a-Mousson.
Raymond E. Walker, Ideal-Standard, Paris.

Germany

J. Severin Ahlmann, Rendsburg.
Ahlmann, Kate, Ahlmann-Carlshutte K.G., Rendsburg.
Ernst Ammer, Metallwerk Richard Ammer KG, Reutlingen.
Ernst Baenninger, Baenninger Malleable Iron Foundry, Giessen.

continued on page 85

Foundrymen from far-off India enjoying themselves at the International Reception on Sunday afternoon, May 4, were, left to right: Dr. D. R. Malhotra of Bombay (back to camera), Mehli G. Reporter of Bombay, P. P. Bhatnagar of Jainshedpur, and S. B. Gupta of New Delhi.

Steel foundry problems hold spotlight at *I. B. F. Annual Meeting*

TOM MAKEMSON / *Secretary, Institute of British Foundrymen*

■ Some 600 delegates and their ladies attended the 49th Annual Conference of the Institute of British Foundrymen at Buxton, a famous vacation spot near Sheffield, England.

Since Sheffield is one of the world's great steel foundry centers, the program of technical papers naturally had a strong accent on steel foundry practices.

Dr. Cyril J. Dadswell, a director of the English Steel Corporation, Sheffield, and a steel foundry technologist of international reputation, was elected president of IBF for the coming year. Edward Longden, Manchester consulting engineer, and John Bell of Albert Smith & Co., Glasgow, Scotland, were elected senior and junior vice-presidents, respectively.

The Oliver Stubbs Medal for service to the Institute was awarded to Harry G. Hall of Castings Limited, Walsall, malleable foundry technologist. The E. J. Fox Medal for service to the foundry industry was awarded to Arthur E. Peace of Leys Malleable Castings, Ltd., Derby, Chairman of the IBF Technical Council.

Recipient of the Meritorious Services Medal was John Jackson of Burnley, Lancashire. British Foundry Medal for the best paper of the year was awarded Kenneth H. Wright for his paper on *"Chilled Rolls."*

First Conference technical paper was the Edward Williams Lecture, presented by Prof. R. J. Sargant of the University of Sheffield. Prof. Sargant spoke on *"Fuel and Metal."*

Outstanding on the technical program was the Official Exchange Paper of the American Foundrymen's Society to IBF, *"The Role of the Research Foundry Unit,"* given by G. A. Lillieqvist, American Steel Foundries, Chicago, before a session of the entire congress.

Report of the IBF Sub-Committee T.S. 35, dealing with *"The Flow of Metal,"* was presented next, and was illustrated with a unique color film prepared with the cooperation of the sub-committee.

Two other steel founding sessions were held. Featured at these sessions

C. J. Dadswell

was presentation of the Official Belgian Exchange Paper, *"Manufacture of High Quality Steel Castings at a Competitive Price,"* by J. J. Dewez. F. Cousans presented a paper on *"Probable Trends in British Steel Foundry Practice"* at these sessions and also collaborated on a paper, *"Production of Manganese Steel Castings."*

Research on *"Atmospheric Dust in Steel Foundries"* was dealt with by G. M. Michie and D. H. Jowett. *"Thermal Expansion and Contraction of Compacted Steel Founding Sands and Mold Washes,"* was the title of a paper by D. V. Atterton. Also on the steel program was *"Recent Experience with Basic and Acid Electric Steel,"* by L. W. Sanders, and *"Gamma Radiography in the Foundry,"* by R. J. Hart, completing a series of valuable contributions to steel founding.

Iron foundry practice was covered in several papers by British authorities—*"Strength, Structure and Composition of Unalloyed Gray Irons,"* by J. Raymond Jones, in which production of large ingot molds using a slinger unit was described; and a paper by J. Richardson and C. F. Lawson, Brightside Foundry & Engineering Co., on production of heavy iron castings.

Nodular iron was discussed by I. C. H. Hughes in his paper, *"Some Effects of Magnesium on the Formation of Graphite in Solidifying Cast Iron."* The Institute's Sub-Committee T.S. 32 presented a report on *"Internal Stress in Castings."*

A valuable session on non-ferrous foundry practice was devoted to three papers: *"Sand Cast Beryllium Bronze,"* by Louis Grand, Official French Exchange Paper; *"Gas Removal from Molten Alloys,"* A. W. Brace; and *"Grain Refinement of Non-Ferrous Castings,"* G. Swinyard.

The Sheffield aspect of the Conference was particularly stressed on the closing day, when the whole of the Conference, members and their ladies, toured Sheffield by motor coach and automobile. In the morning, parties inspected the plants of Sheepbridge Equipment, Ltd., at Chesterfield; David Brown Foundries at Penistone, and Hadfields, Ltd., Sheffield.

A luncheon attended by 450 persons was held in the City Hall, Sheffield, and was attended by the Lord Mayor and Lady Mayoress of Sheffield, the Mayor of Buxton and many industrial leaders. In the afternoon, plants visited were: Newton, Chambers & Co.; Brightside Foundry & Engineering Co., Ltd.; Edgar Allen & Co.; English Steel Corporation, Ltd.; and the Osborn Foundry & Engineering Co. The whole party returned to Buxton in time for the concluding function, a dinner dance.

Other conference social functions included the Conference opening on June 10 in the Pavillon at Buxton, and the Official Banquet June 11 at the Palace Hotel Buxton, attended by some 600.

The Conference was outstanding by virtue of the very high standard of papers and discussions and the well-organized plant visits.

Students give impressions of *International Foundry Congress*

The Student Delegate Plan, used for the first time at the International Foundry Congress & Show in May, has already paid dividends to the foundry industry in the form of increased awareness of the importance and scope of the metal castings industry on the part of young engineering students.

Under the plan, two student delegates were selected from each A.F.S. student chapter and/or Foundry Educational Foundation school. Rail, hotel accommodations and daily expenses were arranged by A.F.S. and FEF groups, as were attendance at the A.F.S. Annual Banquet and the International Educational Dinner. Each of the student delegates was given every opportunity to attend technical and educational sessions and to look over the newest tools of the industry at the giant Foundry Show.

Five cash prizes of $100 each were offered by Claude B. Schneible, Claude B. Schneible Co., Detroit, FEF board chairman, for the best 500 to 1,000 word written report on "*My Impressions of the 1952 International Congress & Show.*" Winners are:

Jack Wheeler, Missouri School of Mines, Rolla, Mo.

Ray Decker, University of Michigan, Ann Arbor, Mich.

Arthur Zrimsek, University of Wisconsin, Madison.

Joseph Alber, Northwestern University, Evanston, Ill.

Ernest Frens, Michigan State College, East Lansing, Mich.

Impressions

A few of the impressions of the International Foundry Congress found in the papers are:

"The exhibits and technical sessions showed that the foundry industry is up-to-date and aggressive—not a 'dying industry.'"

"The foundrymen and exhibitors went out of their way to make the students feel at home."

"Exhibitors were especially cooperative in explaining equipment, particularly after they found that we were foundry students."

"Operating exhibits were particularly impressive. We saw more equipment than we believed existed."

"I was impressed with the willingness of foundrymen to exchange their ideas."

"Evidence of the Society's greatness was the smooth, well-planned operation of the Congress, which gave us the impression that it had been rehearsed.

"Technical sessions were even more practical than I anticipated."

"Every progressive foundry should send its key men to A.F.S. Conventions each year."

"The entire world could take a lesson in cooperation from the International Foundry Congress."

"It was interesting to learn that overseas foundrymen have many problems in common with Americans."

Student delegates to the 1952 A.F.S. International Foundry Congress & Show. Back row, from left: Joseph Alber and Edward Campbell, Northwestern University; Ray Decker, University of Michigan; George K. Dreher, executive director, Foundry Educational Foundation; William Beardsley, Oregon State College; Jack Thompson, Missouri School of Mines; and Wesley Hauschildt, Michigan State College. Front row: Arthur Zrimsek, University of Wisconsin; Charles Utterback, Oregon State College; Philip Lunetta, University of Michigan; Donald Adolphson, Illinois Institute of Technology; Robert J. Christ, University of Wisconsin; Jack M. Wheeler, Missouri School of Mines; and Ernest Frens, Michigan State College. Photograph was taken at the International Educational Dinner the evening of Tuesday, May 6.

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A.F.S. Publications

	Publication Number	A.F.S. Members	Non-Members
Books			
Alloy Cast Irons Handbook (2nd Edition)	1	$2.75	$4.50
Analysis of Casting Defects	3	2.50	4.25
Copper-Base Alloys Foundry Practices	57	3.75	5.75
Cupola Operations Handbook	7	6.00	10.00
Development of Metal Castings Industry	8	3.00	6.00
Foundry Core Practice (2nd Edition)	38	6.50	10.00
Foundry Sand Handbook (6th Edition)	12	3.50	5.25
Foundry Work	50	1.76	1.76
Recommended Practices for Sand Casting Aluminum & Magnesium Alloys	24	1.00	1.75
Symposia			
Foundry Dust Control	10	1.00	2.00
Graphitization of White Cast Iron	13	2.25	4.00
Malleable Foundry Sand and Core Practice	16	2.00	3.25
Sand Test Data for Production of Steel Castings	47	3.00	4.75
Symposium on Principles of Gating	56	4.00	5.75
Foundry cost booklets			
Classification of Foundry Cost Factors	6	1.00	2.00
Foundry Cost Methods	9	1.50	3.00
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Fundamentals of Design, Construction and Maintenance of Exhaust Systems	19	3.00	5.00
Good Practices for Metal Cleaning Sanitation	20	1.25	2.25
Grinding, Polishing and Buffing Equipment Sanitation	22	.75	.75
Industrial Housekeeping and Sanitation	23	1.00	2.00
Safety Practice for Protection of Workers in Foundries	21	1.25	2.25
Testing and Measuring Air Flow	26	1.00	2.00
Annual Transactions			
Volume 53—1945	30	4.00	15.00
Volume 54—1946	31	4.00	15.00
Volume 55—1947	32	4.00	15.00
Volume 57—1949	33	8.00	15.00
Volume 59—1951	48	8.00	15.00
Index to AFS Transactions (1930-1940)	36	1.00	2.00
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Foundry Apprentice Course Outline	39	1.00	2.00
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A. F. S. research progress reports			
Aluminum and Magnesium—A Study of the Principles of Gating	54	1.00	1.50
Brass and Bronze—Melt Quality and Fracture Characteristics of 85-5-5-5	55	1.00	1.50
Gray Iron—Risering of Gray Iron Castings—Report No. 1	42	1.00	2.00
Gray Iron—Risering of Gray Iron Castings—Report No. 2	43	1.00	2.00
Malleable—Surface Hardening of Pearlitic Malleable Irons	52	.40	.60
Steel—Steel Sands at Elevated Temperatures (Tenth)	53	.40	.60
A. F. S. special publications			
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Cupola Research Committee Reports	49	1.00	1.50
Engineering Properties of Cast Iron	46	2.25	3.50
85-5-5-5 Test Bar Design (Fourth Annual Lecture—1946)	37	1.00	2.00
Gating Terminology Chart (Discount on Quantity Lots)		.10	.25
Graphite Classification Chart (25 x 38 in.)	44	1.25	1.75
Pattern Standard Color Chart (Discount on Quantity Lots)	35	.10	.25
Permanent Mold Castings Bibliography	18	1.50	3.00
Other publications			
Aluminum Foundry Process Control (SAE)	2	1.00	2.50
Ferrous Foundry Process Control (SAE)	11	1.50	2.50
Gates and Risers for Castings (Penton Pub. Co.)	40	6.00	6.00
Non-Ferrous Melting Practice (AIME)	41	3.00	3.50

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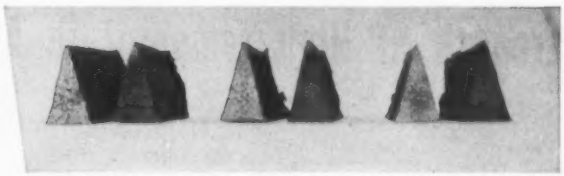

Photo of 1" chill test bars show advantages of Nisiloy. In each pair, wedge on left is white, and was cast without Nisiloy. Right hand wedges used progressively 1 to 1½% Nisiloy. Notice complete elimination of hard white iron on specimen at extreme right.

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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

How CHROMIUM and TUNGSTEN Increase Strength of High-Temperature Alloys

The aircraft field has served as an important "proving ground" for the high-temperature alloys that have been developed for gas turbines required to operate at elevated temperatures. However, these alloys are now demonstrating their superior properties for other primary power applications, including gas turbines to operate electrical generators for stationary or motive power.

While there are literally dozens of different alloys available for high-temperature use, most of them contain the alloying elements chromium and tungsten for the express purpose of enhancing resistance to scaling and increasing their hardness and strength at elevated temperatures. The amount used is generally determined by the stresses and temperatures expected in service. Other alloying metals may also be added for special purposes — such as columbium, manganese, silicon, and titanium.

Chromium and Tungsten as Strength-Builders

Even small amounts of chromium and tungsten are effective in increasing the strength of high-temperature alloys. An important consideration is, of course, the exposure time—particularly when operating temperatures go above 1200 degrees Fahrenheit. Although the major role of chromium is to prevent scaling, it has been found that chromium, as well as tungsten, also helps the alloys to maintain their strength when they are exposed to high temperatures for long periods of time.

In addition to chromium and tungsten, the combination of other alloying metals present will likewise influence the strength of the alloys. Heat-treatment, too, will influence the properties of these materials. However, in obtaining the higher ranges of strength needed at extremely high temperatures, chromium and tungsten are essential.

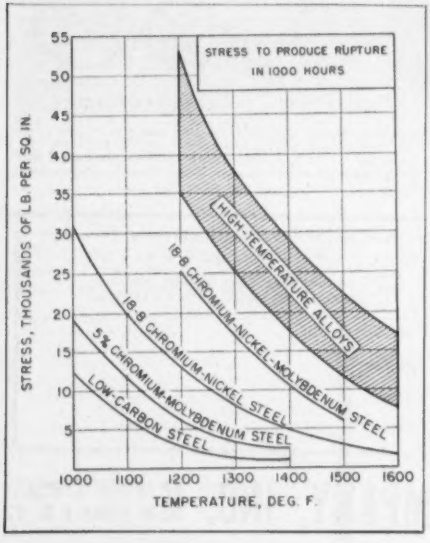

Fig. 1—Here is the average range of strength of various high-temperature alloys compared with other metals.

Where High-Temperature Alloys Are Used

Special high-temperature alloys containing chromium and tungsten are being used for the construction of gas turbines that power railroad locomotives, ships, airplanes, and electric generating plants. Some typical parts made of these alloys are rotors, turbine blades, nozzle vanes, ducts, and housings. These parts are exposed to temperatures of from 1200 to 1500 degrees Fahrenheit.

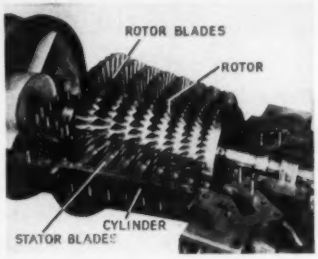

Fig. 2—Rotor and stator blades in this locomotive-type gas turbine are precision-cast of an alloy containing about 24 per cent chromium and 6 per cent tungsten. The rotor body and cylinder housing are forged from an alloy containing about 19 per cent chromium and 1.2 per cent tungsten.

If You Need Technical Help

Those producing high-temperature alloys who wish technical help in the selection of alloying metals will find ELECTROMET's metallurgists glad to cooperate. In addition to chromium and tungsten alloys, ELECTROMET also produces ferro-alloys of columbium, manganese, silicon, and titanium for use in making high-temperature alloys. If you wish further information about the properties and uses of these alloys, write to the nearest ELECTROMET office.

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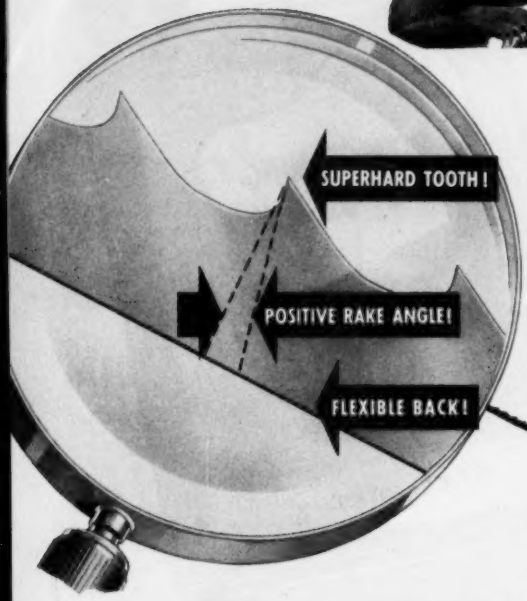

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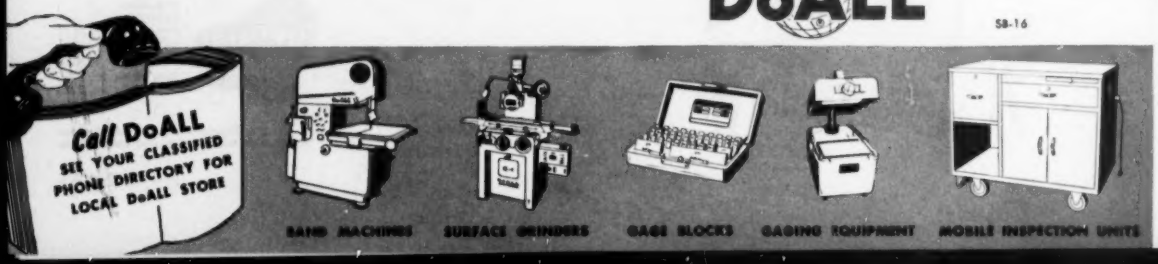

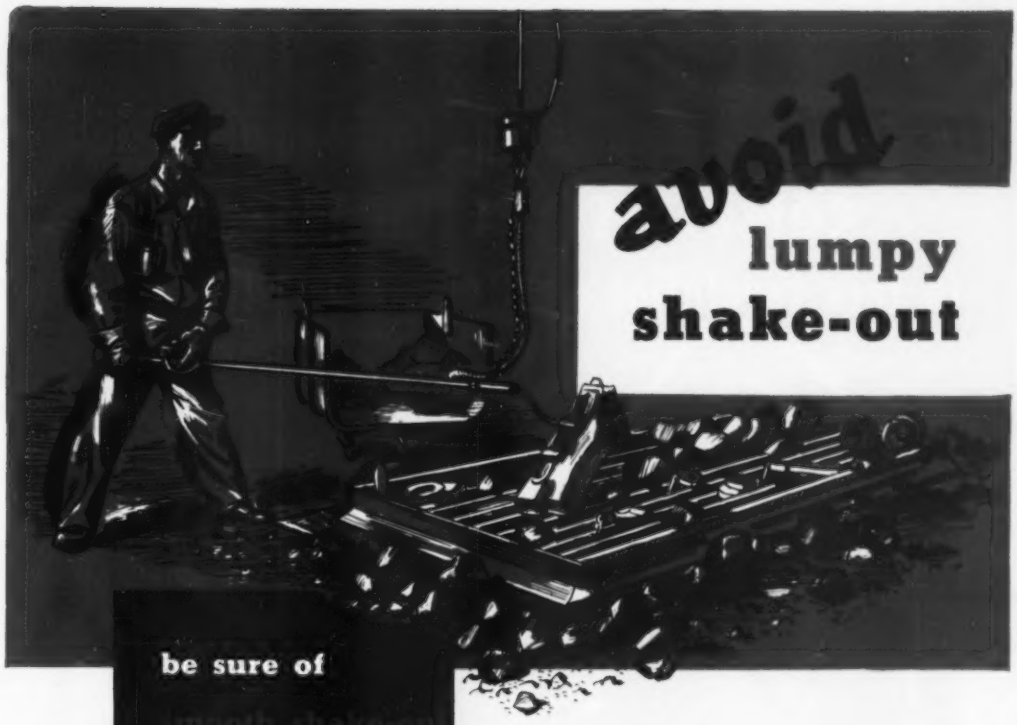

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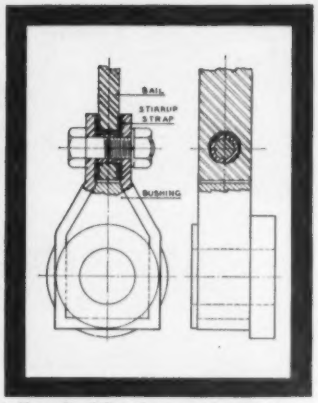

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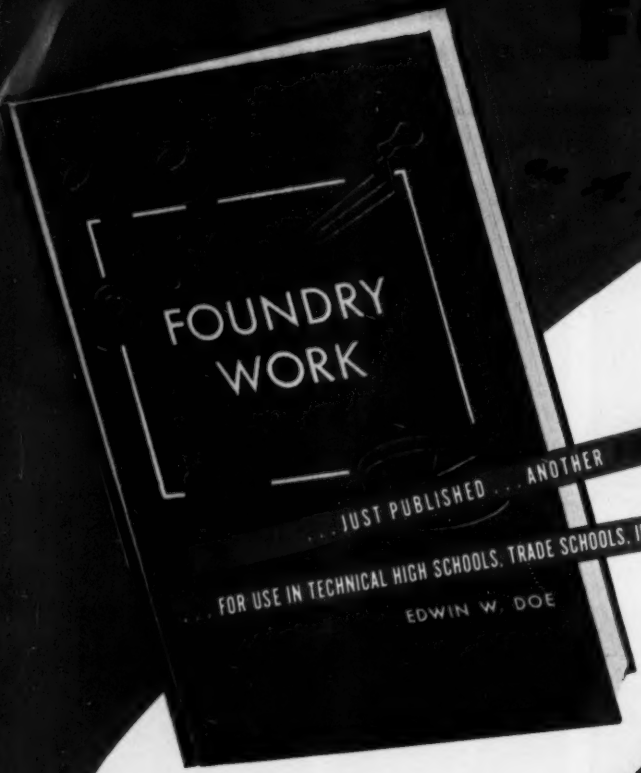

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▶ *Report gray iron foundry productivity information*

■ Improved manufacturing techniques based on actual work experience are reported in a case study of 20 gray iron foundries recently issued by the United States Department of Labor. A 104-page, 8½ x 11, mimeographed book, the publication statistics on equipment, methods, materials, man-hours, and production in plants ranging from 75 to 2500 employees. Also included are forms used for production records and control.

Copies of *Case Study Data on Productivity and Factory Performance—Gray Iron Foundries* are available gratis, until the supply is exhausted, from Bureau of Labor Statistics, United States Department of Labor, Washington 25, D.C.

▶ *Redesign contest open to all*

■ Cash awards totalling $500 will be divided among the winners in the Redesign Contest of the Gray Iron Founders' Society. Open to anyone in the metal working field, the contest is intended to encourage wider use of gray iron by recognizing those who have successfully used gray iron as an alternate for other materials. Awards will be presented at the GIFS annual meeting October 16-17 at the Hotel Cleveland, Cleveland.

Photographs or drawings and descriptive material for entry in the Redesign Contest should be sent to: Gray Iron Founders' Society, 210 National City-E. 6th Bldg., Cleveland 14, Ohio. Entries which won the 1951 Redesign Contest are described in "Redesigned for Gray Iron Casting Production," page 94, May 1952 issue of AMERICAN FOUNDRYMAN.

▶ *Dedicate foundry technical institute in Western Germany*

■ The new Foundry Institute of the Rhineland-Westphalia Technical Institute of Aachen (Western Germany) was formally opened March 13. Started with the creation of a faculty for general metallography in 1923, activities shifted more and more toward foundry until in 1930 an experimental foundry and a special foundry faculty were developed. The laboratories were largely destroyed during the war.

The new institute will train foundry engineers for the German foundry industry, fifth in importance among the country's key industries. Early courses follow metallurgical lines but then develop into plant economics, operation, and management. In addition to the faculty, authorities in the industry deliver lectures on their special fields of achievement. Work at the new Aachen Foundry Institute embraces research as well as teaching.

▶ *Wins camera for best estimate of abrasive grains in bottle*

■ W. G. Nebgen, Caterpillar Tractor Co., Peoria, Ill., estimated that there were 19,400 grains of abrasive in a bottle displayed during a contest staged in the Pennsylvania Glass Sand Corp. (Pittsburgh), booth at the recent International Foundry Congress in Atlantic City. His estimate was closest to the figure of 19,366 grains counted, certified, and notarized by Penn-Sand laboratory personnel. Prize was a Polaroid camera with flash attachment.

A.F.S. National Officers and Directors and representatives of the 41 A.F.S. chapters at the Chapter Officers Conference, held June 12 and 13 at the Sherman Hotel, Chicago. Left to right at the speakers' table are Earl M. Strick, Erie Malleable Iron Co., Erie, Pa.; Vice-President Elect Collins L. Carter, President Walter L. Seelbach, President Elect I. R. Wagner (standing), Secretary-Treasurer Wm. W. Maloney and Technical Director S. C. Massari.

chapternews

Chapter officers Conference

Representatives of the Society's 41 chapters, national officers and directors, staff members, and guests met at the Sherman Hotel in Chicago June 12 and 13 for the 9th Annual Chapter Officers Conference. Total attendance was 107 including 82 chapter officers, mostly chairmen and program chairmen. Represented for the first time was the new Corn Belt Chapter which was formally organized May 26. Chairman of the conference was President Elect I. R. Wagner, Electric Steel Castings Co., Indianapolis, Ind.

Conference speakers who discussed chapter and national activities included President Walter L. Seelbach, Superior Foundry, Inc., Cleveland, Vice-President Elect Collins L. Carter, Albion Malleable Iron Co., Albion, Mich., Secretary-Treasurer Wm. W. Maloney, Technical Director S. C. Massari, Wm. N. Davis, Safety & Hygiene & Air Pollution director, Jos. E. Foster, technical assistant, Herbert F. Scobie, editor, AMERICAN FOUNDRYMAN, and Terry Koeller, advertising and promotion manager.

Behind the scenes, keeping room reservations and luncheon arrangements moving smoothly was A. A. Hilbron, A.F.S. convention and exhibits manager.

Guest speakers were George K. Dreher, executive director, Foundry Educational Foundation, Earl M. Strick, Erie Malleable Iron Co., Erie, Pa., and Prof. Roy W. Schroeder, University of Illinois (Navy Pier), Chicago.

Conferees participated heavily in discussions of Society technical activities, program building, national office operations, AMERICAN FOUNDRYMAN, the new national headquarters building, educational programs, membership work, the job of the chapter chairman, safety & hygiene & air pollution, and local and national finances.

Without chapters, President Elect Wagner said in opening the conference, A.F.S. would not be one of the major technical societies it is today. He recalled being chairman of the first Chapter Officers Conference in 1944 and traced the development of the conference from a short, one-day meeting to today's two-day meeting with every hour filled.

President Seelbach, sketching in the background for the conference, stated that the technical program is the most important activity of a chapter. The chairman is responsible for seeing that the program chairman and committee do their jobs, he said, and the chapter board of directors should approve the program.

Chapter speakers should conform to the same standards as Convention speakers, declared Mr. Seelbach. He predicted a membership of 15,000 of A.F.S., pointing out that mere numbers is not the goal but rather the aim is to achieve the widest possible dissemination of good foundry information.

The National Office does not make the Society rules but merely carries out the wishes of the membership and the national directors, he pointed out. President Seelbach closed by thanking the chapters for their efforts to advance the foundry industry during the past year.

Technical Director Massari described the technical operations of A.F.S. and outlined division and committee make-up. He commended committee members and their companies for giving so much of their time and energy in advancing the industry and the Society.

During the session on the work of the program chairman which followed, Mr. Massari stated that a good chapter technical program keeps a chapter strong and able to do its intended job. He told how Speaker Evaluation Reports received from the chapters aid in finding good speakers and avoiding poor ones.

In a lengthy discussion, conferees traded experiences and ideas on developing programs, securing speakers, and inducing technical discussion.

During the luncheon, Vice-President Elect Carter congratulated President Seelbach, the officers and directors, and the A.F.S. staff on the recent International Foundry Congress. He cited the

A.F.S. National President I. R. Wagner of Indianapolis, Conference chairman, opening the Chapter Officers Conference on June 12.

Getting a warm welcome from A.F.S. National Secretary-Treasurer Wm. W. Maloney (right) at the Chapter Officers Conference are, left to right: Mo-Kan chapter's Vice-Chairman William N. Chivvis, Magnus Metal Div., National Lead Co., and Chairman J. F. Redman, Jr., Redman Pattern Works; and Tri-State Chapter's Vice-Chairman D. W. Harris, Frank Wheatley Pump & Valve Co., and Chairman Clyde C. Beagle, Webb Corp.

reactions of exhibitors at the post-Convention Exhibits Committee meeting on the overwhelming success of the Congress.

The 1953 A.F.S. Convention (non-exhibit) will be held in Chicago with the 1954 Foundry Congress and Show in Cleveland.

"Paris in '53" is the slogan for foundrymen already thinking about next year's International, said Mr. Carter. With the meeting re-scheduled for the week of September 20, heavy attendance from foundrymen of North America is anticipated. A 5-week tour of Europe is already in preliminary planning stages, he announced.

Leading off the afternoon session with a talk on the National Office, Secretary-Treasurer Maloney described the national organization of the Society and its breakdown into administrative and technical activities. The A.F.S. organization chart has the membership, from which stems all activities and authority, at the top, he declared.

AMERICAN FOUNDRYMAN Editor Scobie told briefly how the magazine serves the foundry industry and gave suggestions for chapter chairmen to take back to their reporters. Advertising Manager Koeller joined in the discussion period which followed.

President Seelbach reported on the success of the building project solicitation and the disappointment of having a rezoning petition fall through at the last minute after all previous indications had been favorable. Plans and an architect are ready for action as soon as a new site is found, he said.

George K. Dreher reported briefly on FEF operations and suggested activities and objectives designed to promote foundry-educational work at the various educational levels. He urged inclusion of talks on education in regional conference programs and as coffee talks at chapter technical meetings.

Conferees outlined their chapter educational programs and Earl M. Strick presented a film strip and narration developed by the Northwestern Pennsylvania Chapter to encourage young men to seek a career in the foundry industry.

Technical Assistant Foster reviewed the 1952 A.F.S. Apprentice Contest and announced that the 1953 competition would open October 1, 1952.

Messrs. Wagner and Carter outlined the work of the Chapter Contacts Committee of the Board which during the coming year will be headed by Carter. Preliminary plans for each chapter to be visited by at least one national officer or director were announced.

Conference attendants got better acquainted at the Conference Dinner concluding the first day's activities. Principal address was a humorous talk by Henry Pildner, introduced as chief of the industrial division, Atomic Energy Commission.

Society membership should be built up to bring new blood into the chapters, to make sure the chapters truly represent the castings industry in their localities, and to give the industry the widest possible contacts with A.F.S. benefits, Mr. Wagner said in starting the second day's activities. During the ensuing discussion on membership work, Mr. Maloney reviewed the current membership report and noted that as of May 31 the chapters had exceeded the goal of 10,000 members which had been set for June 30.

Chapters with unusually good records of membership increase told how they built up management interest, awarded prizes for bringing in new members, appointed plant and regional membership chairmen, and held chapter meetings in areas where membership was low.

Maloney discussed the chapter chairman's job and drew attention to the helpful information contained in the *Chapter Manual*.

Mr. Seelbach initiated a session on the Safety & Hygiene & Air Pollution Program, citing the increasing problem of air pollution, and told how the National Casting Council requested A.F.S. to set up a program on behalf of the foundry industry.

Wm. N. Davis was introduced as director of the S&H&AP program. He reviewed the program briefly and reported that three new S&H&AP manuals are already in preparation by committee members.

Chapter and national finances and the work of the chapter treasurer were discussed by the conferees during a session on income and expenses, and use of surplus funds.

Hi jinks at the mike and keyboard were provided by Joe Grana, Vermont Foundries, left, and Speaker Ralph L. Lee, General Motors Corp., in a social hour preceding Eastern New York chapter's May 20 meeting.

Following luncheon, Maloney summed up the conference following Chairman Wagner's admonition that the meeting would be wasted unless attendants applied the information they had obtained during the two-day meeting.

The conference closed with the customary question and answer session, The Shakeout.

Corn Belt

Newest chapter of A.F.S., "Corn Belt," originally listed as the A.F.S. "Corn Land" Chapter, has revised its roster of officers and directors since formation of the chapter and election of its officers was announced in the June issue of AMERICAN FOUNDRYMAN.

As revised, officers and directors of the new chapter are:

Chairman, Earl White, Paxton-Mitchell Co.; *vice-chairman*, Bert J. Baines, Omaha Steel Works; *secretary*, John C. Henderson, Omaha Steel Works; and

treasurer, George Herman, Oehrle & Bergmann Pattern Works.

Directors to serve three years: David Miller, United Brass Works, Omaha; and Owen Hitchins, Cushman Motor Works, Lincoln. Directors to serve two years: I. M. Johnson, Griffin Wheel Co., and Joseph Elliott, Western Land Roller Co. Directors to serve one year: Joe M. Buckholz, Dempster Mill Mfg. Co., and Jack Bruer, Paxton-Mitchell Co.

Western New York

MARVE TAUBLIEB
Frederic B. Stevens, Inc.

Feature of the May 16 meeting was election of officers. Named to head Western New York chapter as *chairman* is Carl Harmon, Hanna Furnace Corp., Buffalo. Also elected are: Joseph Clifford, Bison Castings, Inc., *vice-chairman*; Martin Pohlman, Pohlman Foundry, treasurer; and Roger E. Walsh, Hickman, Williams & Co., *secretary*. Directors elected to serve three-year terms are:

Tom Malloy, Buaffalo Pipe & Foundry Co.; Lynn Roberts, Combined Supply & Equipment Co., and Robert Forest, Lakeside Bronze Co. Fred Goerke, Standard Buffalo Foundry, will serve as director for one year as an alternate, and Past Chairman Erwin Deutschlander, Worthington Corp., becomes a director for one year.

Mr. Deutschlander was given a past chairman's pin on behalf of the chapter by Alfred A. Diebold, Atlas Steel Castings Co., at the meeting.

St. Louis District

FRED J. BOENEKER
Bronze Alloys Co.

Saturday, August 2 is the date, and the Lemay Grove, 1100 Lemay Ferry Road, St. Louis, the place for the annual picnic and fun festival of the St. Louis Chapter.

Known for its unusual picnics, the picnic committee has developed several outstanding features for the complete entertainment of members and guests. The picnic will go off with a bang at 12:00 noon with the serving of refreshments. A barbecue luncheon will be served from 1:00 to 3:00 p.m., the barbecueing being performed courtesy of John Slay, Bee Line Trucking Co.

Bill Lovely and Len Williams of the Carondelet Fly and Bait Casting Club, will present a demonstration of fly casting methods that will bring in the "big ones." Joe Weber, an outstanding dog trainer, will give pointers on proper methods of training bird dogs. These demonstrations are being made available courtesy of Leacock Sporting Goods Co.

The "Dutchmen's Relay Race" promises to be most entertaining, since the totem carried by the runner will be in the form of liquid refreshment which must be consumed before the next runner can start. In addition there will be horseshoe pitching, cork ball and softball. Valuable prizes will be presented to the winners in the various events, and also there will be attendance prizes.

Clarence W. Culbertson, of Great Lakes Carbon Co. and George L. Mitsch of American Car & Foundry Co. are serving as co-chairmen of the picnic committee, assisted by A. E. Shelton, Shelton Pattern & Engineering Co.; A. S. Hard, of St. Louis Steel Casting Co.; A. E. Hilliard, M. A. Bell Co.; Jack L. Mueller, U. S. Graphite Co.; S. D. Wheeler, of Great Lakes Carbon Corp. and J. H. Weber, American Brake Shoe Co.

Out-of-town guests are always welcome at St. Louis affairs. For picnic tickets please contact Paul E. Retzlaff, Busch-Sulzer Bros. Diesel Engine Co. Div., Nordberg Mfg. Co., 3300 S. Second St., St. Louis 18, Mo.

Southern California

ALFRED A. GRANT
Grant & Company

Eighth regular meeting was held May 23 at the Rodger Young Auditorium, Los Angeles. Attending this meeting as guests of the Chapter were essay contest winners and their instructors from several Southern California City and Junior Colleges.

Following presentation of the winners in the contest, were final discussions in the chapter's *"Cleaning Room Practice"* meetings. First speaker was Ralph Trent, of Pangborn Co., who spoke on impact cleaning and equipment.

He explained the difference between sand blasting, shot, and abrasive cleaning, pointing out uses and limitations of each.

Mr. Trent then introduced A. Leslie Gardner, also of Pangborn Co., who presented a chalk talk coupled with slides to illustrate the history and development of blast and impact cleaning equipment.

It was graphically shown how important the cleaning room is to a foundry as regards production, quality and manpower. Many types of cleaning equipment were shown and explained.

Following Mr. Gardner's discussion, Otto Rosentreter of Inesco Inc., presented a talk aimed at the flow of castings from shakeout to the shipping room. He pointed out the importance of the cleaning room to all foundries; that most foundries have inadequate cleaning rooms served by old and improper equipment; that usually too much manpower is wasted there. Mr. Rosentreter stated that although complete mechanization of all foundries is not possible, many need and can afford modernization of cleaning rooms.

Northwestern Pennsylvania

ROY LODER
Erie Malleable Iron Co.

May 26 meeting was the chapter's first *"Fathers and Sons Night,"* when nearly 50 orphan boys each had as a father for the night, a local foundryman.

Before dinner, the boys were treated to "cokes"; then had dinner, with a hillbilly band furnishing the music, and community singing. This was followed by a showing of the chapter's new film, *"A Career in Metal."*

The evening ended with a talk by Max Barone, secretary, Young Men's Christian Association, on *"My World's Championship Baseball Team of All Time,"* in which he vividly described such all-time baseball greats as Babe Ruth, Ty Cobb, Shoeless Joe Jackson and Honus Wagner.

On Thursday, June 5, the chapter was host to top management of foundries in Northwestern Pennsylvania at a luncheon, when the chapter's film *"A Career in Metal,"* was again shown. This is a film strip in color with narration, and

Plant Manager Verne Righter (left, shaking hands) accepts thanks of Prof. C. C. Sigerfoos on behalf of the A.F.S. Michigan State College student chapter for a plant visit and dinner May 18 at General Motor Corp.'s Saginaw Malleable Iron Plant, Saginaw, Mich.

is designed for showings before school and community groups.

Educational Committee Chairman Earl M. Strick, Erie Malleable Iron Co., narrated the film and discussed how to induce young men to enter the foundry industry.

"A Career in Metal" is available to other A.F.S. chapters by contacting Earl M. Strick, Erie Malleable Iron Co.,

Also featured at the meeting was election of officers for 1952-53.

Saginaw Valley

ROY S. DAHMER
Eaton Mfg. Co.

George A. Jacoby, General Motors Corp. chose *"A Challenge to Foremen"* as his subject for the May 1 meeting. He recently returned from Europe, where he attended an industrial labor conference and visited various industrial plants.

Mr. Jacoby observed many differences between European and American workers and emphasized the role that the foreman plays in influencing the attitude and philosophies of the industrial worker. A. J. Zahn of Eaton Manufacturing Co. served as technical chairman and J. F. Smith of Chevrolet Gray Iron Foundry, General Motors Corp., introduced the speaker.

During a short business meeting the following Chapter officers and directors were elected: *chairman*, Kenneth H. Priestley, Vassar Electroloy Products; *vice-chairman*, F. James McDonald, Central Foundry Division, General Motors Corp.; *secretary*, Woodrow W. Holden, Eaton Manufacturing Co.; *treasurer*, Lenwell A. Cline, Saginaw Foundries Company.

Directors, to serve three year terms are Alfred E. Hilgeman, General Foundry & Manufacturing Co.; G. A. Rogers, Almont Manufacturing Co.; Carl F. Wood, Chevrolet Gray Iron Foundry, General Motors Corp., and Ormond Requadt, Dow Chemical Co.

Michigan State College

B. L. HARDING

On May 18, members of the student chapter were treated to an inspection tour of the Saginaw Malleable Iron Division, General Motors Corporation. The first leg of the trip took the group to the plant's new dining room for a steak dinner, after which the students were taken through the plant by department supervisors, who doubled as guides and encyclopedias.

Of great interest was the high degree of mechanization which prevailed throughout the foundry, as was the evidence of Saginaw's Malleable's efforts to become "the cleanest foundry in the country". It was hinted that one more exhaust fan on the roof would lift the building!

Reconvening, the group took part in a question-answer session, and Plant Manager Verne Righter accepted the M.S.C. chapter's invitation to serve as one of its industrial advisors for the coming school year. Student Chapter President Ernest Frens expressed the group's appreciation for a highly interesting and educational evening.

Eastern New York

KENNETH F. ECHARD
Eddy Valve Co.

Chairman John E. Waugh, General Electric Co., presided at the May 20 meeting held at Circle Inn, Lathams, when the following were elected officers for the coming term: *chairman*, Leigh M. Townley, Adirondack Foundries & Steel; *vice-chairman*, Ed Lawrence, General Electric Co.; *secretary-treasurer*, William Stevenson, Rensselaer Valve Co.

Directors elected for three years are: Charles Fuller, General Electric Co.; Guy Haines, Sheridan Iron Works; and Kenneth Mason, Albany Castings Co.

The speaker for the evening was Ralph Lee of General Motors Corporation, who discussed *"The Need for Facts in the Human Element."*

Mr. Lee combined wit and experience in dealing with people to develop four points: first, everyone differs from everyone else in makeup; second, most people cannot change as much as might be required or desired, because of the "metallurgy" of human beings; third, people are not the same at all times, because of environmental conditions affecting them; and fourth, an individual is inordinately proud of his own characteristics.

Ralph Hassett of Texas Foundries, Inc., Lufkin, right speaking on coreboxes as a worker demonstrates their use during a recent visit of Texas Chapter to Texas Foundries, Inc. Photograph courtesy of F. M. Wittlinger, Texas Electric Steel Casting Co., Houston.

Wisconsin chapter's Past President Robert E. Woodward, Bucyrus-Erie Co., left, presents retiring Chapter President George E. Tisdale, Zenith Foundry Co., with a past president's ring during the chapter's recent "Old Timers' and Apprentices Night." Photograph courtesy Walter V. Napp, Delta Oil Products Co.

Chesapeake

JOSEPH O. DANKO, JR.
Arlington Bronze & Aluminum Corp.

Last scheduled meeting of the year, held May 23, featured election of officers and a talk by Harold Bogart, Ford Motor Co., Dearborn, Mich., on *"Foundry Developments at Home and Abroad."*

Mr. Bogart explained four new foundry techniques, still in experimental stages:

(1) Water-cooled elements in the cupola and around tuyeres which do not require covering with refractories, and cupolas that run for weeks without relining.

(2) Bleeding oxygen into cupola blasts when iron is too cold, such as at the beginning of a heat.

(3) Humidity control of cupola air to eliminate one variable.

(4) Multiplexing cupolas with an electric furnace for more economy.

Tri-State

J. G. WINGET
Reda Pump Co.

May 16 meeting speaker was George P. Halliwell, H. Kramer & Co., Chicago, who discussed major brass and bronze foundry operations, with emphasis on

Present at a dinner in Mexico City's Centro Asturiano June 5 at a dinner honoring retiring Mexico City Chapter Chairman N. S. Covacevich, La Consolidada, S. A., were clockwise around table from lower left: Pedro Gomez, Francisco Andion, Incoming Chairman Juan Latapi, Francisco Diaz Covarrubias, Manuel de la Torre, Vice-Chairman Frank Madrigal, Manual Goichochea, Mr. Covacevich, Fernando Gonzalez, Secoundio Ruiz, F. Arriola, Isidro Lopez, Jorge Zugarramurdi, Enrique Varela and Chapter Secretary Louis Delgado Vega.

Headliners at Quad City Chapter's May 19 meeting were, left to right: Roy Ray, J. I. Case Co., Bettendorf, Iowa, meeting technical chairman; Speaker Lawrence D. Pridmore, International Molding Machine Co., La Grange Park, Ill.; and Chapter Vice-Chairman Boyd Hayes of John Deere Malleable Works, East Moline, Ill. Photo by Rock Island (Ill.) *Argus*.

A.F.S. research at Battelle Memorial Institute on effects of mold materials on physical properties of red brass.

In his discussion of brass and bronze melting techniques. Mr. Halliwell advanced the theory that furnace atmosphere in itself is relatively unimportant, provided it is under control at all times. Several methods of checking melt quality prior to casting were also given.

New elected officers of the chapter are: *chairman*, Clyde Beagle, Webb Corp.; *vice-chairman*, W. H. Harris, Frank Wheatley Pump Co.; and *treasurer*, C. O. Beckitt, Progressive Brass Co.

Central New York

RALPH J. DENTON
Ralph J. Denton Co.

June 14 marked close of activities for the season with a clambake held at Darlene's Inn on Oneida Lake. Attendance numbered 160 foundrymen and friends.

Afternoon's activities featured a pie eating contest, 50-yard dash and egg-throwing contest. International Heater Co., Utica, won both the egg-throwing prize and pie eating championship. Credit for the event goes to William Dunn, Oberdorfer Foundries, Inc., and his committee.

Twin City

J. D. JOHNSON
Archer-Daniels-Midland Co.

May meeting featured election of officers and directors and a talk by Donald J. Murray, Borden Co., New York on "*Resin-Bonded Core Sands.*"

Nearly 90 members and guests met at the Covered Wagon, Minneapolis, for the business session and talk.

Elected for 1952-53 are:

Chairman, J. W. Costello, American Hoist & Derrick Co.; *vice-chairman*, O. J. Myers, Archer-Daniels-Midland Co.; director for one year, Norman Wisner, Foundry Supply Co. Directors elected to three-year terms are: C. Fred Quest, J. F. Quest Foundry Co.; William Williamson, Minneapolis-Moline Power Implement Co., Carter De Laittre, Minneapolis Electric Steel Casting Co., and Richard Wilson, American Hoist & Derrick Co.

In his talk on resin core binders, Mr. Murray said urea resin the "workhorse of resin binders." Phenols, he said, are used only against heavy metal sections and for high-melting point metals.

Mr. Murray stressed the need for better-than-average sand control methods if resin binders are to be used successfully and reported that stickiness presents no difficulties in core boxes. Wooden boxes were not recommended for resin-bonded mixtures.

Only people actually allergic to resin binders cannot work with them, Mr. Murray stated, and pointed out that the vast majority develop no skin irritations if they observe the customary rules of cleanliness. Advantages cited by Mr. Murray for resin binders include fast baking, collapsibility and adaptability to high-frequency and infra-red baking.

Quad City

ERIC WELANDER
John Deere Malleable Works

Sixteen of the original members of the Quad-City Foundrymens Association were honored at the May 19 meeting. These men were among the organizers of the Foundry Association in the Quad-City area in 1922. The organization functioned independently until 1935, when it came associated with A.F.S. Past officers of the chapter were also honored.

Lawrence D. Pridmore, International Molding Machine Co., LaGrange Park, Ill., spoke on "*Core Blowing.*"

Mr. Pridmore explained the importance of proper venting of core boxes and the proper sizing and location of blow holes.

In conjunction with his presentation, Mr. Pridmore displayed numerous gadgets for use in core boxes, and actually blew cores on two small core blowers set up for the demonstration.

Officers elected to serve for the coming year are: *chairman*, Boyd Hays, John Deere Malleable Works; *vice-chairman*, Eric Welander, John Deere Malleable Works; *secretary-treasurer*, Robert Miller, John Deere Planter Works.

Directors are: William Ellison, Thiem Products Inc.; Clifford Erickson, Frank Foundries; Leo Jackson, J. I. Case Company; and Lee Ingersoll, Iowa Malleable.

Birmingham District

J. P. MC CLENDON
Stockham Valves & Fittings, Inc.

Fred K. Brown, Adams, Rowe & Norman, Inc., was elected chairman of the chapter at its final meeting before adjourning for the summer months. Other officers elected were: Biddle W. Worthington, McWane Cast Iron Pipe Co., *vice chairman;* and John F. Dren-

Central Indiana chapter past chairmen honored at the chapter's "Pats Chairmen's Night" on May 19 included: (top row, left to right) Allen Reid, General Refractories Corp., and Robert Langsenkamp, Langsenkamp-Wheeler Brass Works. Front row, left to right: A.F.S. National President Elect I. R. Wagner, and Franklin S. Swain, Golden Foundry Co. Photo courtesy Henry O. Yeager of International Harvester Co., Indianapolis.

ning, Kerchner, Marshall & Co., *secretary-treasurer*. Directors elected were: Charles S. Martin, M & H Valve & Fittings Co., E. C. Finch, American Cast Iron Pipe Co., A. J. Fruchtl, U. S. Pipe & Foundry Co. and Aubrey H. White, Stockham Valves & Fittings, Inc.

T. H. Benners, chairman of the Educational Committee, awarded $350 in Defense Bonds to winners in the local chapter's apprenticeship contest: $50 Bonds to Duvall H. Easley, Mark C. Gregoire, John L. Cummings and A. G. Lovvorn; $25 Bonds to Paul W. Townes, Donald Snyder Brown, Raymond C. Pearson, Douglas E. Kelley; $10 in defense stamps to Vernon L. Bradford, Sylvester S. Lathem, David S. Luck and Jeff Bell.

Charles K. Donoho, retiring chairman, presided over the short business session and then introduced M. L. Carl, quiz master for a *"Technical Quiz Program."* Mr. Carl then introduced the panel of experts: J. A. Bowers (Steel), Vernice I. Byford (General Foundry Practice), Dr. J. T. MacKenzie (Foundry Metallurgy), Robert L. Jones (Patterns and Pressure Castings), Frank W. Lane (Sand), Asa Lloyd (Non-Ferrous), J. V. Blackman (Coke), M. D. Neptune (Cupola Operation). Many technical questions dealing with actual problems in these many fields were asked and ably answered by the experts for the hundred odd foundrymen and friends that were in attendance.

Eastern New York

KENNETH F. ECHARD
Eddy Valve Co.

Chairman John E. Waugh, General Electric Co., presided over the third annual joint meeting with the Eastern New York Chapter of ASM at the Circle Inn, Lathams.

ASM Chairman Berkeley Ellis, American Locomotive Co., conduoted the business session for his organization. Nomination slates were featured in both chapters brief business periods.

Robert Curran, in charge of the Repair Welding Section, Works Department, General Electric Co., discussed *"Repair Welding of Alloy Steel Castings"*, using well-chosen slides to emphasize his remarks.

Mr. Curran developed the idea that welding permits "re-working" of castings, especially when size, intricacy, and pressure requirements are such that the original casting cannot meet all specifications. Three good methods of testing for defects were discussed—magnetic, x-ray, and supersonic.

Precautions must be taken to remove defects completely in preparing an area for welding, and to remove as small an amount of metal as possible.

The very interesting gas-gouging method of removing defective metal was fully treated by the speaker, who stated that as much as 75 lb of metal can be removed by one operator per hour.

The bead deposit must insure a sound weld, and small diameter rods, such as 5/64-inch, serve very well.

The importance of welding is often seen where two or more parts of castings, once attempted as a whole casting, are re-designed and parts welded to allow better foundry practice, he said.

Important in the fabrication of alloy-steel castings, according to Mr. Curran, are three considerations: pre-heating, selection of electrodes, and the stress-relief that must be achieved.

Toledo

GERALD GROTT
Unitcast Corp.

March 12 meeting had as its speaker William F. Winemiller, Norton Co., who discussed *"Foundry Refractories."*

Mr. Winemiller told how such refractories as silicon carbide, fused alumina, and fused and stabilized zirconia are produced for foundry use, and explained their advantages and applications.

A question and answer session on the use of these refractories in the members' foundries followed the talk. It was generally concluded that, while super-refractories are not the cure-all for foundry refractory problems, a careful study of service conditions may allow them to be used to considerable advantage in specific applications.

▶ *Other Organizations*

Reading

May 20 meeting talk was given by Clyde B. Jenni, General Steel Castings Corp., Eddystone, Pa. Mr. Jenni explained four common methods of sand reclamation: (1) dry, (2) wet, (3) thermal, and (4) a combination of wet and thermal systems.

The last of these methods is superior to the others in Mr. Jenni's opinion, because it employs both heat and water-scrubbing. The speaker was introduced by Technical Chairman A. L. Wentzel.

New England

May meeting of the New England Foundrymen's Association, held at the Kenmore Hotel, Boston, had 80 members and guests attending, including three members of the A.F.S. MIT student chapter—Carl Scheid, George Abbott and Ronald Harris.

Evening's speaker was Joseph T. Williamson, Westinghouse Electric Corp., Springfield, Mass., who discussed *"Industrial Relations at Work."* Mr. Williamson touched upon many problems management has in common with labor, and said that it is management's duty to keep its direct-line supervision informed as to plans.

Included in this group photographed at Saginaw Valley Chapter's May 1 meeting are, left to right: Verne Righter, Chapter Chairman Albert E. Edwards, Speaker George A. Jacoby, General Motors Corp.; Vice-Chairman Kenneth H. Priestley, J. F. Smith, Woodrow W. Holden, A. J. Zahn and Chapter Secretary F. James McDonald.

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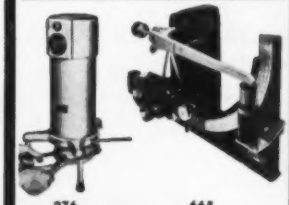
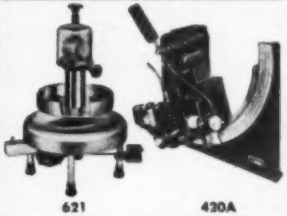
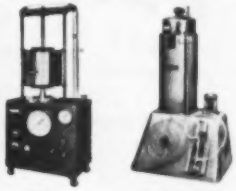
USE THIS EQUIPMENT ➡	 276 665	 621 420A	 785 335
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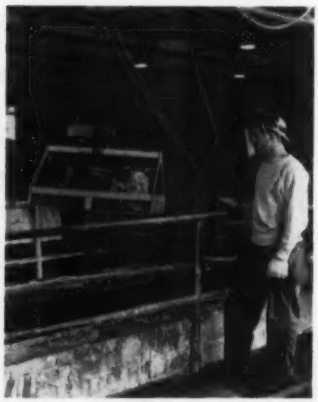
products

continued from page 17

cially suited for use with hot, corrosive materials. They can be used at temperatures to 300 F, and resist chemical attack by strong mineral acids, chlorine, other oxidizing chemicals, common solvents, oils, and weak alkalis. Fabrics are available as yard goods or completed bags and tubes. *Filtration Fabrics Div., Filtration Engineers, Inc.*

709 Metal cleaning bath

Virgo molten cleaner cleans corroded and rejected metal parts through a process consisting of immersion of metals in



a molten salt bath operating at about 850 F, a water quench tank and an acid dip tank. Developed primarily for desanding castings, Virgo molten cleaner has been found applicable to cleaning of both ferrous and non-ferrous metal parts. *Hooker Electrochemical Co.*

710 Truck loader

Applications of any dump truck can be extended by attaching this loader to it. Loader consists of shovel or magnet, arms, and the required hydraulic equipment; it can be used as a lift platform,

a scoop or a light crane. Working directly from the power takeoff of the truck itself, the loader is mounted on the rear of the truck body and is operated by controls on top of the truck cab or by auxiliary controls on the side. A complete set of truck controls is also mounted on top of the cab so that the driver can

maneuver his truck without getting down. The shovel holds one cubic yard of loose material; under tests, it has loaded over one ton per minute and lifted 4400 lb. The 29-in. magnet is operated by a 5-kw generator and works much in the same way as the shovel. The set of chains are used to hook onto containers weighing to 3,000 lb. Attachments are interchangeable. *Efficient Equipment, Inc.*

711 Motorized tractor

Motorized Tractor automatically engages various types of industrial trailers, permitting operation in narrow aisles and accurate spotting of loaded trailers. Grip

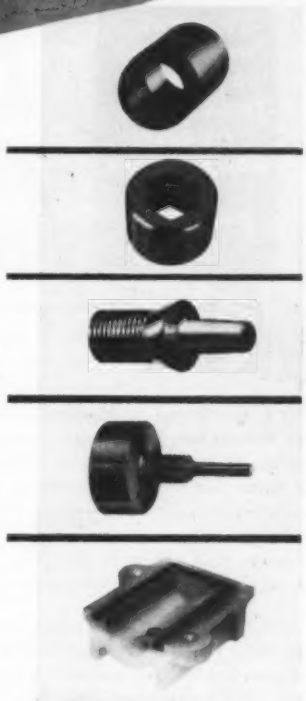
Tow is driven to end of trailer, where tractor hook engages lower side of trailer frame, then secondary hooks engage top part of trailer frame. Next, tractor's trailing wheels lift off floor so that its rear end is supported by the trailer. Grip Tow operates successfully with any caster-type trailer having a projection of edge that can be engaged by the gripping mechanism. *Yale & Towne Mfg. Co.*

712 Pattern shop sander

The Diskette, a high-speed tool for sanding, polishing, grinding, and shaping, is designed specifically for pattern shop use. The tool is 9 in. long with an outside diameter of 2⅜ in., weighing 4½ lb. It is built to stand continuous duty at 8000 rpm. With its universal motor of 110 v, ac or dc, housed in an aluminum alloy casting, it comes furnished with three

composition disks, 4 in. diam. and $^{3}/_{32}$ in. thick, of 36, 80, and 120 grit, and a screw driver plus $^{3}/_{16}$ in. pin wrench. Attachments available include a collet chuck for ⅛ and ¼-in. shanks, a spindle to hold carving tools, rotary files and rasps, an aluminum safety guard, rubber pads, and a bench stand. *Balmer Corp.*

These Products are *LEADERS* in Core Box Protection by MARTIN



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Stop abrasion between blow plate and core box. Protect blow holes.

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United States Steel Co.

information

continued from page 18

485A. Design specifications, space requirements, and similar data are fully presented in condensed form. *National Engineering Co.*

724 Airblast cabinets

Small unit-type airblast cabinets in a variety of sizes are detailed in Catalog 31-A. They are suitable for cleaning small lots of work that can be manipulated by hand, and the production of which is not large enough to justify more elaborate installations. Units are available in both pressure and suction types. *American Wheelabrator & Equipment Corporation.*

725 Industrial ovens

Latest and best applications of ovens for low-temperature heat-treating of ferrous and non-ferrous metals are presented in Bulletin 14-T. Batch and conveyor-type ovens with operating temperatures to 1000 F are included on its pages. *Young Brothers Company.*

726 Sand rammers

Bulletin S-12 offers pertinent data on pneumatic sand rammers. Cutaway drawing shows internal construction; features are clearly pointed out and described. Two pages in 2 colors tell the story. *Buckeye Tools Corp.*

727 Foundry alloys

Eight-page Catalog 1051 does a neat job of describing a series of alloys used for deoxidizing, degasifying, and hardening. A brief word is also given on aluminum flux and solder. Material is presented in an orderly and compact fashion. *Milward Alloys, Inc.*

728 Crucibles

Steel crucibles suitable for melting magnesium are roughly described in 4-page bulletin "Magnesium Melting" which also contains news about 3 other bulletins describing the crucibles. *American Tank & Fabricating Co.*

729 Industrial furnaces

Containing 38 pages, Booklet B-5459 tells how to match a furnace to a particular heat-treating problem. It describes each of 12 different types of furnaces, both gas and electric, and briefly outlines their chief field of application. A section devoted to special furnaces gives several typical examples of tailor-made units. Booklet also contains several pages of data describing material handling methods in furnaces, atmospheres suitable for heat-treating different metals, average general performance data, and a glossary of heat-treating terms. *Westinghouse Electric Corp.*

730 Exhaust hoods

Engineering data on dust control systems for the metal working industries are contained in 24-page Bulletin 270-E1. In addition to 61 photographs of actual dust control installations showing various methods of hooding dust sources, the bulletin gives tables of exhaust requirements plus information on dust concentrations, weights of collected material, and similar data. *American Air Filter Co., Inc.*

Congress visitors

continued from page 58

Germany (cont'd)

Karl Baenninger, Baenninger Malleable Iron Foundry, Giessen.
William Beer, Foundry August Beer Verbert, Velbert.
Martin Albin Beilhack, Rosenheim Foundry, Rosenheim.
Kurt Borchart, Indugas, Industrie-Und Gasofenbaugh, Gesellschaft, Stiftmuhlenbrink.
Klaus Borner, Aachen Foundry College, Luneburg.
W. Delmmdast, Russ Elecktroofen, Cologar.
Walter Dorn, Robert Basch, Stuttgart.
Alfred Frommhagen, Municipal Council of Western Berlin, Berlin.
Erich Gisy, FAHR., Stockach/Baden.
Rolf H. Goetze, Goetzewerke, Burscheid.
Walter Gross, Gross & Froehlich, Stuttgart.
E. Hagmaier, R. Bosch, Stuttgart.
Heinrich Hepperle, Modellbau Hepperle, Mulheim-Ruhr.
Friedrich Ernst Hohage, Buderus'sche Eisenwerke, Wetzlar.
Karl Wilhelm Erich Hugo, German Foundrymen's Association, Dusseldorf.
Karl Ingendahl, Messrs. Sempell & Co. Buderich.
Otto Jenker, Lammersdorf.
Theodor Kapusta, Oberkassel-AF Dusseldorf.
Hans Kluppelholz, Solingen-Wald.
Curt Robert Kohler, Alfred Gutmann Gesellschaft Fur Maschinenbau, Reinbek.
Gerhard Kohler, Alfred Gutmann Gesellschaft Fur Maschinenbau, Hamburg-Altona.
Paul Koehler, Gebr. Kemper, Olpe.
Ernst Justus Kohlmeyer, Technical University, Berlin.
Heinrich Lauke, Smelting & Fdy. Wks., Berlin.
Erwin Leibfried, Metallwerk Karl Leibfried, Stuttgart.
Richard Ludwig, Robert Bosch, Stuttgart.
Friedrich V. Meier, Escher Wyss Maschinenfabrik, Ravensburg/Wurtt.
Wilhelm Heinrich Patterson, Technical University, Aachen.
Alfred Peitzmann, Peitzmann Co., Asperg.
Eugen Piwowarksy, Technical University, Aachen.
Gunther Schwietzke, J. G. Schwietzke, Dusseldorf.
Zur Verth, Glasurit-Werke, Hamburg.
Rudolf Weidner, Gemorkoschaft Eisenhutte, Lunen-Wethmar.
Wilhelm Friedrich Wenz, Klein, Schanzlin & Becker, Frankenthal/Palatinate.
Carl Julius Werneth, Eisengiesserei Triberg, Triberg.
Paul Ziegler, Aluminumwerke Nurnberg, Nurnberg.

continued on following page

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AMERICA'S LARGEST PRODUCERS OF ALLOYS

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Manganese copper is used principally for the introduction of Manganese into brass, bronze and nickel silver. It is supplied in the form of shot or bars that can be cut to any reasonable weight that the user may require.

GRADE "A" — will conform to the following composition:

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Total Impurities	0.5% Maximum
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Constantine Mylonas, National Technical University, Athens.

India

P. P. Bhatnagar, National Metallurgical Laboratory, Jamhedpur.
N. G. Chakravarty, Bhartia Electric Co., Ltd., Calcutta.
S. N. Chakravarty, Mukand Iron & Steel Works Ltd., Bombay.
S. B. Gupta, Central Tractor Organization, North Delhi.
August Kentscher, Bombay.
D. R. Malhotra, Western Railway, Bombay.
Mehl G. Reporter, Bombay.
Arjan Vaswani, The Institute of Indian Foundryman, Calcutta.

Ireland

J. H. Witham, Tonge & Toggart, Ltd., Dublin.

Israel

Chanan Ophir, Israel Railroad Foundry, Haifa.

Italy

Beppe Alberti, Fonderice e Officine di Saronno, Milan.
Valerio Artigian, Furnace & Steel Works of Italy, Genoa.
Eduardo Capello, National Italian Foundry Assn., Milan.
Quinto Costa, Foundry & Forgings, Rorino.
Aldo Dacco, Associazione Italiana de Metallurgia, Milan.
Victorio Baldo Bertoni di Sambuy, Microfusione Italiana Milan, Milan.
Aldo Dacco, Associazione Italiana de Metallurgia, Milan.
Fremont Felix, Cia. Generale di Electricito, Milan.
Giacomo Ferrero, Franco Tosi, Legnano.
Elio Fronzaroli, National Consortium for Supplies of Raw Materials, Milan.
Corrado Galletto, Centro di Fonderia and Centro D'Informazioni del Nickel, Milano.
Mario Guastalla, Terni Co., Rome.
Fredercik Hansberg, Amina Tambelli Hansberg.
Luigi Lodigiani, Joint Stock Co., Piacenza.
Carlo Longaretti, Institute for Siderurgy Finsider, Genoa.
Antonio Montanari, Ing. Antonio Montanari Works & Foundries, Magenta.
Eugenio Mortara, Caster SPA., Milan.
Guiseppe Romagnoli-Mosca, "Fargas" Milan.
Mario Noris, Institute for Siderurgy Finsider, Genoa.
Mario Andrea Pensotti, Andrea Pensotti, Legnano.
Carlo Pensotti, Society Mario Pensotti, Legnano.
Mario Olivo, Impianti Fonderie Olivo, Milano.
Arturo Pala, Central Castings & Fabricating Steel Products Sector, Genoa.

Aldo Paravicini, A.S.A. Foundry Torino.
Alexander Perego, Impianti Fonderie Olivo, Milan.
L. Sossi, Fiat S.P.A., Torino.
Egidio Tamagnini, Necchi & Campiglio Pavia.
Pietro Tavolotti, Terni Co., Terni.
V. Valdevit, Valdevit Giovanni & Co., Modena.
Antonio Vismara, Works Vismara Joint Stock Co., Milan.

Japan

Takeshi Akutagawa.
Toshiaki Hiraki.
Masamichi Sugi, Iron Pipe Fitting Association, Kuwana City.
Kanhiehi Tanaka, Kubota Iron & Machinery Works, Ltd., Osaka-shi.
Kohei Taniguchi, Kawasaki Steel Corp., Tokyo.
Kokichiro Toyoda, Toyoda Automatic Loom Wks., Ltd.
N. Yamamoto, Shin-Fuso Metal Industries, Osaka.
Yoshiyuki Hotta, Kobe Cast Iron Works, Ltd., Kobe.
Masamitsu Iijima, Kyokuto Boeki Kaisha, Ltd., Tokyo.
K. Ishikawa, Tokyo Shibaura Electric Co., Kawasaki.

Mexico

Eugene J. Ash, Conexiones Nacionales S.A., Monterrey.
Urbano Lopez Ayala, The Teziutlan Copper Co., Aire Libre.
N. S. Covacevich, La Consolidada S.A., Mexico City.
Javier Lopez, Cia. Industrial del Norte S.A., Sahillo.

Netherlands

J. S. Abouwer, Werkspoor N.V, Utrecht.
B. Braat, Machine Factory Rijneveld, Delft.
Ir. W. F. Brandsma, Dutch Technical Foundry Assn., Velsen N.
J. Jan Dresselhuys, Zaadgevend Bureau Berenshot, Amsterdam.
B. Goedkopp, First Stichtse Brass Foundry & Machine Factory Eskem, Blauwkapel.
Albert Baron Krayenhoff, Netherlands Iron Foundry, Amersfoort.
A. Ph. Krijff, "*Metalen*", Emmalaan.
M.M. H. Lips, Lis' Screw Works Ltd., Drunen.
Robert Reneman, Vaassen Industries Ltd., Vaassen.
Jurrienk Ubbink, Ubbink & Co., Ltd., Doesburg.
H. J. Meerkemp Van Embden, Research Laboratory, Philips Ltd., Eindhoven.

Norway

Aksel Arstal, Stoperiteknisk Forening, Oslo.
Diderik Cappelen, Ulefos Jernvaerk, Ulefos.
David Lie Eide, A/S Bergens Jernstoberi, Bergen.
Arne Krogvik, Jotul & Kvarner Fdy. Inc., Oslo.
Bjorn Langum, A/S Myrens Verksted.
Finn Owre, A/S Drammens Jernstoberi, Drammen.
John Sissener, A/S Myrens Verksted, Oslo.

Peru

David Marsano, Fundicion Callao S.A., Callas.
Renato Mario Delfino, Philippine Council for U.S., Pasay City.
Isabelo Africa Tapia, National Shipyard & Steel Corp., Quezon City.

Portugal

Joao Marques, Metalurgica Duarte Ferriera, Lisbon.
Antonio Paixao, Metalurgica Duarte Ferriera, Lisbon.
Humberto Silva, Francisco Antonio da Silva, Lda., Torres Vedras.
Alfredo Alves, Alfredo Alves & Co., Filhos.

Scotland

John Bell, Institute of British Foundrymen, Glasgow.

continued on following page

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THE MODERN MOISTUREPROOF CORE AND MOLD SURFACE CONDITIONER FOR
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Advantages of Paraspray

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Why Paraspray Is Different

- **PARASPRAY, basically a waterproof cement, quickly and tightly *BINDS* together loose grains of sand on the surface of cores and molds.**
- **PARASPRAY fills a necessary requirement in *MOLD ATMOSPHERE CONTROL*. It completely gasifies at about 400° F. leaving a thin film of amorphous carbon. The inert gas formed replaces *AIR* in mold cavity, providing *A DE-OXIDIZED ATMOSPHERE* which prevents oxidation of surface of molten metal.**
- **PARASPRAY provides complete moisture control. *A PARASPRAY* film on surface of core or mold *PREVENTS MOISTURE* absorption or loss from molds in green sand work; especially where synthetic sands are used.**
- **PARASPRAY is the ideal carrier for graphite, silica, mica, zircon flour and other materials used as core and mold surfacing agents to produce smoother castings.**

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Goran Flodman, AB L. M. Ericson, Stockholm.
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Yngve Granstrom, ASEA, Vasteras.
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Lars Villner, Sveriges Mekanforbund, Stockholm.
K. G. Westin, AB Westin & Backlund, Stockholm.

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August Anderes, S.A. Adolphe Saner, Arbon.
Albert Duenner Foundry Designs, Schaffhausen.
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Max Esher, Consulting Foundry Engineer, Zurich.
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Frank Mahorcic, Iron & Steel Wks., Gustanj.
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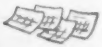
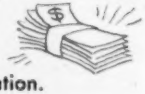
Cannon Brand Core Sand is made from quality Muskegon Lake Sand. It is dried and graded coarse, regular and fine. A uniform ASF grain analysis of 39, 47 and 55 is maintained by constant daily testing. 

This means less core losses, consistently uniform molds and many dollars  saved in your overall foundry operation.

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foundrymen

continued from page 28

Pittsburgh Rolls and Lewis Rolls, and will have full responsibility for metallurgy in the company's Pittsburgh foundries.

George Uhle Sr. and **George Uhle Jr.** have been named agents in the Cleveland and urban area for American Foundries Co., Milan, Mich. They will also represent Taylor & Boggis Foundry Co. and Mohawk Foundries Inc., both of Cleveland. Mr. Uhle Sr. will be remembered as former ace of the Cleveland Indians' pitching staff.

▶ Obituaries

C. Laurence Warwick, for 33 years ASTM's chief administrative officer, died April 23. Born in Philadelphia in 1889, he received his BS degree from the University of Pennsylvania in Civil Engineering. He continued at the university as an instructor and subsequently became an assistant professor of structural engineering. While on the university

C. L. Warwick

faculty, Mr. Warwick assisted in ASTM staff work and was named assistant secretary in 1917. In 1919 he was elected secretary-treasurer, a title he held until 1946 when the title of the chief administrative office was changed to that of executive secretary. He represented the society in a number of activities, including the ASME advisory board on engineering index, the American Marine Standards Committee, and the American Association for the Advancement of Science. At the time of his death he was serving as chairman of the ASTM Ordnance Advisory Committee, a post he considered one of his most important responsibilities. During the war Mr. Warwick headed the Specifications Branch of the Conservation Division of the WPB, and directed the National Emergency Steel Specifications project.

Harry R. Crawford died recently in Portland, Ore. He was born in 1886 in New Castle, Pa., and came to Portland in 1912. For 25 years he was a part owner of the Central Brass Foundry and was later associated with the City Brass Foundry.

Hiram P. MacKinnon died in his sleep in Atlantic City on May 6. He was 79 years old, and had been in the foundry business for 52 of those years. He was attending his 35th A.F.S. convention. Born in Old Lynn, Conn., he had retired 4 years ago from Great Lakes Foundry Sand Co., Detroit, where he had been sand blast engineer.

Charles G. Sellers, safety engineer for Stockham Valves & Fittings, Inc., Birmingham, Ala., died April 10 after 33 years service with the firm. Mr. Sellers was a graduate of Howard College.

Warren H. Turner, 51, died in Detroit March 13 after several months' illness. He had been district sales engineer for the Norton Co.

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Use BUCKEYE Silica Firestone!
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Nature has endowed Buckeye Silica Firestone with every feature needed in modern refractory material. Its widespread efficiency, long life and attractive cost are well known to foundry and steel mill executives everywhere.
Under conditions where comparative tests have been made, Buckeye is first everytime! Its natural, uniformly-balanced combination of chemical and mechanical properties makes its superiority unquestioned. Its microscopically open and porous structure provides exceptional resistance to heat and abrasion.
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Available in units of: 2 tool drawers and 1 shallow drawer, 2 tool drawers and 3 shallow drawers, or 5 shallow drawers—for table top widths of 36" or 42". One tool drawer is equipped with an individual lock.

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In trouble?—Semet-Solvay metallurgists are practical foundrymen who will always be glad to help with your melting problems. Take advantage of their broad experience and get the most out of your Semet-Solvay coke.

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for Better Melting

What's new

continued from page 43

tric pouring device were exhibited at an A.F.S. Foundry Show for the first time this year. Contrasted with these and other full-scale melting and pouring equipment on display were a miniature, operating cupola, a scale model direct arc furnace which did everything but melt, and a model of a furnace designed by Leonardo da Vinci nearly 500 years ago.

Designed for investment casting, the induction furnace provides for fast, accurate melting, and rolls over mechanically to pour molds clamped

Small induction furnace tilts mechanically for ease in investment casting.

New small coreblower handles vertically-split coreboxes, blows thru bottom.

to the top. Typical melting cycle: 12 minutes for 5 lb of alloy steel.

The new indirect arc furnace, designed for small heats and research work, has a 15-lb capacity. The two electrodes converge through the roof, bringing the arc down to the charge. Bottom of the furnace is

Five-station table moves core boxes through blower on left and roll-over on right to produce a core a minute automatically. Unit is used in high production shops.

fitted with handles like a two-man ladle and can be handled that way or by a light hoist. Roof swings to one side for charging.

The electric pouring device handles ladles up to 1000-lb capacity. Rack and pinion for raising and lowering ladle are electrically driven with power coming from overhead conductors, eliminating cables. Motor switch is rigidly located conveniently near manually-operated pouring wheel.

Refractories

A new design of refractory gun for lining furnaces was moved from Los Angeles to Atlantic City by automobile when the manufacturer learned about the International Foundry Congress and Show a few days before it opened. Set up in hastily created space, the manufacturer displayed an air placement gun that delivers several cubic feet an hour to 4 cu yd per hour. Operator has control over material volume, moisture, and air volume. By changing nozzles, machine can be turned into a sandblasting unit.

Cleaning and finishing

New casting cleaning and finishing tools exhibited were an airless blasting barrel and an electric hand grinder. The new airless blasting barrel, available in 6 and 12-cu ft capacity, is designed to give fast cleaning with minimum loss of abrasive. Wires and chill nails cannot get out of the cleaning chamber into the mechanism and the rubber covered door is expected to reduce wear and maintenance. Castings are loaded and unloaded mechanically.

The hand grinder exhibited operates on 360 cycles, has more horsepower than any portable grinder available, and is estimated to save 400 to 500 per cent in power operating costs. Required is a frequency converter which will operate up to 10 or a dozen 360 cycle grinders.

Special feature of grinder is ability to run at almost full speed at high loads.

▶ *Cope and Drag Club studies grain distribution and packing*

■ Holding their quarterly technical meeting during the recent International Foundry Congress, Cope and Drag Club members heard Jos. S. Schumacher, Hill & Griffith Co., Cincinnati, report on the latest developments in 4-screen sand. The same sand, he said, is being used for both iron and steel. Steel valves weighing 2400 lb formerly cast in dry sand, he declared, are now cast in green sand containing 9 per cent carbon without carbon pickup and with a reduction in cleaning time from 22 hours to five hours.

C. E. Wenninger, National Engineering Co., Chicago, described preliminary studies on sand grain agglomeration in mixing and sand handling. Grains lump together, he asserted, in cubic, rhombohedral, and various intermediate patterns of packing.

Club President Eugene Conreaux, Granite City, Ill., presided during the meeting. New officers of the group are: president, Jos. S. Schumacher; vice-president, Eugene W. Smith, Chicago; and secretary-treasurer, Bradley H. Booth, Carpenter Bros., Inc., Milwaukee.

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foundry tradenews

Borden Co., New York, is now operating its new chemical plant at Demopolis, Ala. Plant is the first in this area to make formaldehyde, hexamethylenetetramine, and synthetic resins. Plant occupies about one-third of a 20-acre tract, and was built at a cost of over $1,000,000.

Lindgren Foundry Co., Batavia, Ill., has started construction on an additional building with 5000 sq ft of floor space. Lindgren makes semi-steel and gray iron castings.

The Mechanite Metal Corp., New Rochelle, N.Y., has contracted to install its casting manufacture processes at the Franklin, Pa., foundry of **Chicago Pneumatic Tool Co.**

Colonial Aluminum Smelting Corp., Columbia, Pa., put their new secondary aluminum smelter into operation May 1. Production is of secondary aluminum ingots.

Apex Metal Products Corp., Cleveland, has acquired an exclusive license for the continuous casting of aluminum and all other non-ferrous metals under the Goss patents. This process for producing bar stock for screw machine and forging operations involves no intermediate forming, and represents the fastest path from molten metal to screw machine or forging hammer. Billets for extrusion and slabs for rolling can also be made.

Allis-Chalmers Mfg. Co., Milwaukee, reports that its new 86 x 74-ft concrete building at the West Allis works will be completed soon. Building will house a 22-million volt betatron for use in inspecting large steam turbine, centrifugal pump, and hydraulic turbine parts produced by the company. Walls, when completed, will be 6 ft thick, 20 ft high. X-ray room itself will be able to hold a railroad car if necessary.

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., announces the formation of a new wholly owned subsidiary, **Birdsboro Armorcast, Inc.,** to make hull and turret castings for tanks. The new corporation will be one of the major suppliers for the Chrysler tank plant at Newark, Del. In order to maintain the needed production level, a plant adjacent to the present property has been leased from the Navy. Plant will be managed and operated by Birdsboro, with production and inspection supervised by the Philadelphia Ordnance District. Initial order for armor castings is in excess of $10,000,000.

Milwaukee Die Casting Co., Milwaukee, has moved into a new plant with 44,000 sq ft of floor area, ⅓ more than the old plant. All operations are on one floor. Special ventilation and cooling is provided in the die casting department.

Capitol Foundry Co., Phoenix, Ariz., has acquired a large tract of land six miles southeast of Phoenix and plans to build a large foundry there at a cost of over $1,600,000. The new foundry operation, with its scrap preparation yard, will cover 35 acres. It will produce cast steel grinding balls for the mining industry, and will have an annual capacity of 25,000 tons. Production is scheduled to start this time next year.

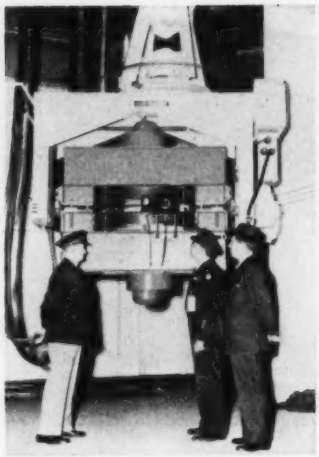
Illinois Gear & Machine Co., Chicago, has purchased about 200,000 sq ft of land adjacent to its main office and works. An existing building on the new property will be occupied by a pattern shop and pattern storage. Balance of the land will be improved to expand the company's machine shops, heat treating facilities, and parking area.

Hamilton Foundry & Machine Co., Hamilton, Ohio, recently participated with a number of other Hamilton industries in the annual observance of Business-Industry-Education Day. About 25 teachers from local public and parochial schools were given safety goggles, told to stay with their guides, and sent on a complete tour of the plant. A question-and-answer period at the end of the tour provided them with an opportunity to further increase their new-found knowledge.

Chain Belt Co. is now occupying its new administration building at 4701 W. Greenfield Ave., Milwaukee. New building, of brick, stainless steel, and glass, is directly adjacent to Chain Belt's local manufacturing facilities.

DoALL Co. has shifted its research lab into bigger quarters at 254 N. Laurel Ave., Des Plaines, Ill. New arrangement will permit the company to more fully exploit the possibilities of band machining.

Basic Refractories Inc. reports that two new rotary kilns, the largest in the refractory industry, are being erected at the Maple Grove, Ohio plant. Kilns are part of the company's $3,500,000 expansion program. They are each 390 ft long and 11 ft in diameter, and were built by Allis-Chalmers Mfg Co. When in operation they will dead-burn about 2000 tons of dolomite daily, expanding Basic's annual production of granular dolomitic refractories by some 50 per cent.



Army officers inspect a 24-million volt betatron used at General Steel Castings Corp., Granite City, Ill., to inspect armor steel castings for tanks. The betatron can penetrate 7 to 9 in. of armor steel in slightly more than a minute and provides a sharp x-ray photographic record. Examining the betatron are, left to right: Col. B. C. Fowlkes, Jr., commandant, Granite City Army Engineer Depot; Col. J. D. Childs, deputy chief, St. Louis Ordnance District; and C. P. Whitehead, president, General Steel Castings Corporation.

Commercial Iron Works, Portland, Ore., was damaged to the extent of $85,000 on April 22 by a three-alarm fire. The blaze apparently started in the area of the cupolas where slag had been poured for cooling. About 65 per cent of the 2-story building was destroyed by the flame, which first burst through the roof shortly after 6 AM. Although no one was hurt, many valuable patterns were lost.

Lewis Foundry & Machine Div., Blaw-Knox Co., is nearing completion of its modernization program. New equipment permits Lewis to compete for the largest types of rolling mills and similar equipment. Volume capacity will be extended by 50 to 60 per cent. Typical of the new equipment is a 409,000-lb. milling and boring machine, the cutter of which is carried by a 24-in. ram to reach into pockets as deep at 74 inches. Head has a vertical travel of 12 ft, horizontal travel of 46 ft. Machine draws 195 hp.

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Servicing the cupola

A201 . . "Organizing the Melting Department in a Cast-Iron Foundry," L. Bigard, *Fonderie*, Vol. 71, December 1951, pp. 2729-2737. (in French)

Suggestions for sound organization of the servicing of the cupola station in a cast-iron foundry are made, both for small-production units and for large cupola batteries. Various types of bucket cars, cranes, elevators, etc., and various layouts for the combination of the transporting, weighing and charging operations are illustrated.

Inoculating cast iron

A202 . . "Inoculation of Cast Iron," W. S. Williams, *Iron and Steel*, Vol. 25, No. 1, January 1952, pp. 9-10, 32.

Experimental work on inoculation of cast iron with calcium silicide in the Quasi-Bessemer process has shown that the inoculant can be dissolved at a lower temperature and at a higher sulfur content than is ordinarily realized. Ingot molds made by this process have shown longer life than those made by other methods.

Magnesium castings

A203 . . "Light Metal Castings for Aircraft Structures," K. F. Finlay, *Metal Progress*, Vol. 61, January 1952, pp. 81-83.

Many German magnesium castings are used in the as-cast condition, while American tradition says that the castings must be heat-treated. High dimensional fidelity without machining can be obtained by a semi-forging technique in which oversize castings are coined in a precision die; the as-cast structure is preserved, and physical properties are improved by the slight working.

Heat-supplying gate inserts

A204 . . "Use of Heat-supplying Gate Insets in Steel Foundry," E. Lanzendorfer, *Giesserei*, Vol. 38, December 27, 1951, pp. 661-664. (in German)

Experimental data are preserved on the technical details, advantages, and possible applications of the technique

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of heat-supplying gate insets. These insets are prepared in various shapes from materials in which heat is freed through chemical reactions. A lateral heating of the gate is thus ensured, which keeps the metal in the liquid state for longer periods than those possible with conventional methods.

Faster radiographs

A205 . . "Xeroradiography Can Cut X-ray Inspection Costs," M. D. Phillips and S. A. Wenk, *Iron Age*, Vol. 168, No. 22, November 29, 1951, pp. 86-89.

This newly developed technique produces radiographs by discharging a semi-conductor film of sulfur or selenium. The latent electrical image is made visible by a powder which may be transferred to paper to produce a permanent record. Good contrast is possible. The speed of xeroradiographic plates is greater than type "M" film.

Accuracy of radiography

A206 . . "High Quality Nonferrous Castings Assured by Use of Radiography," C. B. Johnson and S. A. Brosky, *Materials and Methods*, Vol. 34, December 1951, pp. 73-75.

An attempt has been made to correlate the appearance and acceptability of nonferrous castings with radiographic examinations. A uniform and equiaxed grain structure is indicative of a sound casting. Microporosity which appears as a fine mottled structure on the radiograph can be the cause of leaking. Slicing of castings has shown that the x-ray technique agrees nearly 100% with destructive examination.

Growth of cast iron

A207 . . "Cast Irons, Growth Characteristics," W. C. Heselwood and F. B. Pickering, *Iron and Steel*, Vol. 24, December 15, 1951, pp. 596-600.

Experimental work has been carried on to evaluate and determine the methods of growth of gray iron isothermally and on repeated heating cycles in vacuum and in air. Comparison between ingot mold life and growth test results compare very favorably. A formula is given for calculating growth from the chemical analysis of the iron.

Basic-lined cupola

A208 . . "The Cupola Furnace with Basic Lining," *Fonderie Belge*, December 1951, pp. 230-233. (in French)

The 1951 researchers of the Ghent Study Station investigated the basic lined cupola furnace. The smallest existing cupola furnace (or cubilot) used by the researchers is described. A table giving the composition of magnesia bricks used for lining is included. Reasons for failure of early attempts are mentioned. Advantages of the basic lined cubilot are listed and a table of results is included.

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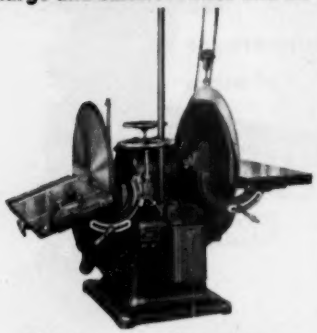

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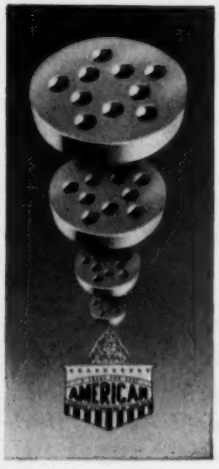

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coming events

EDITOR'S NOTE: Annual Meeting of the National Foundry Association, listed in the June issue as being held on November 10-11-12, will instead by held September 18 and 19 at the Edgewater Beach Hotel, Chicago.

July

25 . . Philadelphia
Manufacturer's Golf and Country Club. Annual picnic and golf outing.

25 . . Twin City
Midland Hills Country Club. Annual golf tournament and dinner.

August

11-13 . . Sand School
Engineering Society, Detroit. To be conducted by the Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich. Write for reservations.

September

6 . . Central Indiana
Lake Shore Country Club, Indianapolis, Ind. Picnic and Golf Outing.

8-10 . . American Standards Association
Museum of Science & Industry, Chicago. National Standardization Conference.

8-12 . . Instrument Society of America
Annual Meeting, Cleveland.

8-13 . . Molding Materials Program
Sponsored by the Massachusetts Institute of Technology, Cambridge, Mass. *"Chemistry and Mechanics of Molding Materials."*

13 . . Michiana
Plymouth Country Club, Plymouth, Indiana. Annual picnic.

18-19 . . National Foundry Association
Edgewater Beach Hotel, Chicago. Annual Meeting.

22-23 . . Steel Founders' Society
Homestead, Hot Springs, Va. Fall Meeting.

26-27 . . Ohio Regional Foundry Conference
Ohio State University, Columbus, Ohio. Sponsored by A.F.S. Canton District, Central Ohio, Cincinnati District, Northeastern Ohio and Toledo Chapters and Ohio State Student Chapter.

30-October 3 . . Iron & Steel Exposition
Public Auditorium, Cleveland. Association of Iron and Steel Engineers.

October

16-17 . . Gray Iron Founders' Society
Hotel Cleveland, Cleveland. Annual Meeting.

16-18 . . Foundry Equipment Manufacturers' Association
The Greenbrier, White Sulphur Springs, W. Va. Annual Meeting.

coming events

17-18 . . Michigan Regional Foundry Conference
University of Michigan, Ann Arbor, Sponsored by A.F.S. Central Michigan, Western Michigan, Detroit and Saginaw Valley Chapters and A.F.S. Michigan State and University of Michigan Student Chapters.

20-24 . . American Society for Metals
Philadelphia National Metal Congress and Exposition.

24-25 . . Northwest Regional Fdy. Conf.
Multnomah Hotel, Portland, Oregon. Sponsored by the Oregon, Washington, and British Columbia Chapters and the Oregon State College Student Chapter of A.F.S.

30-31 . . Metals Casting Conference
Purdue University, West Lafayette, Ind. Sponsored by the Central Indiana and Michiana Chapters and Purdue University.

November

6-7 . . All Canadian Fdy. Conference
Mount Royal Hotel, Montreal, Quebec. Sponsored by A.F.S. Eastern Canada and Ontario Chapters.

13-14 . . Southwest Regional Fdy. Conf.
Hotel Baker, Dallas, Texas. Sponsored by A.F.S. Texas and Tri-State Chapters and Texas A & M Student Chapters.

19 . . American Standards Association
Waldorf-Astoria Hotel, New York. Annual Meeting.

20-21 . . American Society for Quality Control
Claypool Hotel, Indianapolis, Indiana. Seventh Midwest Conference.

December

4-6 . . American Institute of Mining and Metallurgical Engineers
William Penn Hotel, Pittsburgh, Pa. Electric Furnace Steel Conference.

1953

February

19-20 . . Southeastern Regional Conference
Tutwiler Hotel, Birmingham, Ala. Sponsored by Birmingham District & Tennessee Chapters and University of Alabama Student Chapter.

June

29-July 3 . . American Society for Testing Materials
Chalfonte-Haddon Hall, Atlantic City, N. J. Annual Meeting.

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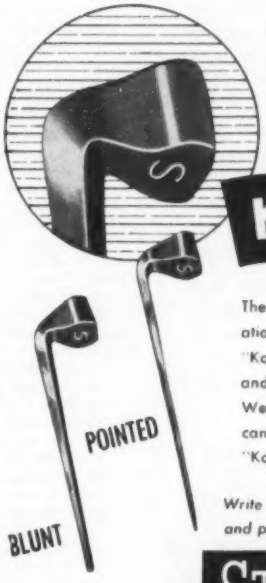

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72 Foundry Work

classified

■ To contact "Help Wanted" or "Position Wanted" advertisers with code number, write to American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill. In replying to "Help Wanted," send outline of background.

▶ Help Wanted

HW 594 Industrial Engineer
Specializing in foundry work. Applicant should be free to travel and understand foundry operations. Sketching and time-study important. Applicant will be trained in special fields. In reply state qualifications, education and enclose photo.

HW 596 Welding Engineer
Experienced welding engineer needed for plant in Chicago area currently engaged in production of armor castings. Man with technical and practical experience in welding steel castings, particularly low alloy castings. Will have opportunity to grow in large steel casting organization.

HW 597 Mechanical Superintendent
Man with wide experience in foundry engineering and maintenance together with considerable administrative background needed to head up plant engineering and maintenance in an extremely large steel foundry in Chicago area. Excellent opportunity for right man to grow in large organization.

HW 598 Pattern Foreman
Experienced in metal patterns, cope and drag. For well-established Southern firm. Permanent position for right party.

HW 599 Foundry Sand Specialist.
Thoroughly acquainted with foundry sand procedures. Position will require extensive testing and research work. Should be capable of writing technical articles and speaking at group meetings. Must be willing to travel up to 50% of time. Age: 30 to 40. Good salary. Chicago firm.

SALES REPRESENTATIVE WANTED
Several territories available for full-time exclusive sales of Al-Si-Mag Foundry Ceramics. A man to sell only our foundry ceramics is needed in several territories because of our growth. This is an excellent opportunity with the nation's largest manufacturer of technical ceramics.

American Lava Corporation
Chattanooga 5, Tenn.
Headquarters for technical ceramics for more than 50 years.

FOUNDRY ENGINEERS and DRAFTSMEN
Having foundry operating or plant experience. Write, enclosing photograph and complete record of education and experience in detail, including previous employers and length of service. State age and salary expected.

LESTER B. KNIGHT & ASSOCIATES
Consulting Engineers
600 W. Jackson Blvd. Chicago 8, Ill.

▶ Positions Wanted

PW 175 Superintendent-Metallurgist
Graduate engineer with 18 years' experience as superintendent and metallurgist in malleable, gray iron and nodular iron foundries desires connection with progressive organization. Capable of taking full charge of all operations, including molding, sand control, melting and annealing. Experience also includes some non-ferrous and ferrous foundry development work.

▶ Opportunities

OPPORTUNITY FOR MOLD DESIGNER
N-131 Expanding Illinois Aluminum Foundry offers excellent opportunity for active participation in ownership to Permanent Mold Designer with excellent qualifications and experience, and a desire to build on a worthwhile enterprise. Inquiries kept confidential.

WILL MERGE OR SELL
Active Aluminum Permanent Mold Foundry with Tool and Die Shop, near Chicago. Established over six years in 4500 sq ft of favorably leased fire-resistant space, with reinforced concrete floors, city water, sewerage. Adjacent to railroad siding and truck headquarters. Complete equipment in good working order. Gas fuel. Additional work force available. Comfortable backlog of orders for castings from a number of large customers. Low overhead and break-even factors.

Might consider becoming captive to manufacturer who can use entire output or merger, thus freeing present owner, from whom prior responsibility demands more time. Open to ideas.

Cash consideration for capital stock would be $25,500, or for fixed assets, deferred charges, good will, etc., $29,000 plus value of inventory at time of sale.

For further details concerning this excellent opportunity, address: **BOX N-30.**

▶ For Sale

BRASS MELTING FURNACE
One Stroman Reverberatory Brass Melting Furnace, 800 lb. capacity, all-fired, Serial No. 912, with loader and No. S-1333-3 blower and some surplus lining brick. This is a good used furnace. Price $2,000.00 F.O.B. our plant. Subject to prior sale.

Northern Indiana Brass Co.
935 Plum St. Elkhart, Ind.

NON-FERROUS FOUNDRY
Metropolitan New Jersey. Railroad siding. Two pit and one tilting oil furnaces, six molding positions with two machines. Also fully-equipped machine shop and stable industrial product.

N-129.

FOR SALE
7 heat-treating furnaces and 7-ton gantry crane—suitable for armor castings. Good condition.

BAER STEEL PRODUCTS, Inc.
Box 1428 Boise, Idaho

▶ Wanted

No. 4-B U.S. Rotary Furnace
Wanted by brass foundry. State serial number, usage and condition, whether oil-fired or gas-fired and whether blower and rotating motor are included and price.

N-128.

GRAY IRON FOUNDRY
Must be in Chicago or immediate Chicago area. 15,000-20,000 sq. ft. floor space. Will consider any building suitable for foundry operation.

N-132.

▶ Professional Services

Harold J. Roast
F.I.M., F.C.S., M.E.I.C.
BRONZE FOUNDRY CONSULTANT
c/o Crown Trust Co.
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Available Coast to Coast

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There is no better time than NOW to review incentives, methods, scheduling, production control and paperwork processes.

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Grey Iron Foundry Consultants
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Established over 25 years
A. H. PUTNAM COMPANY
Rock Island, Illinois

ADEN W. PARIS
Foundry Consultant
Member M.S.A. Consulting Team for Western Europe
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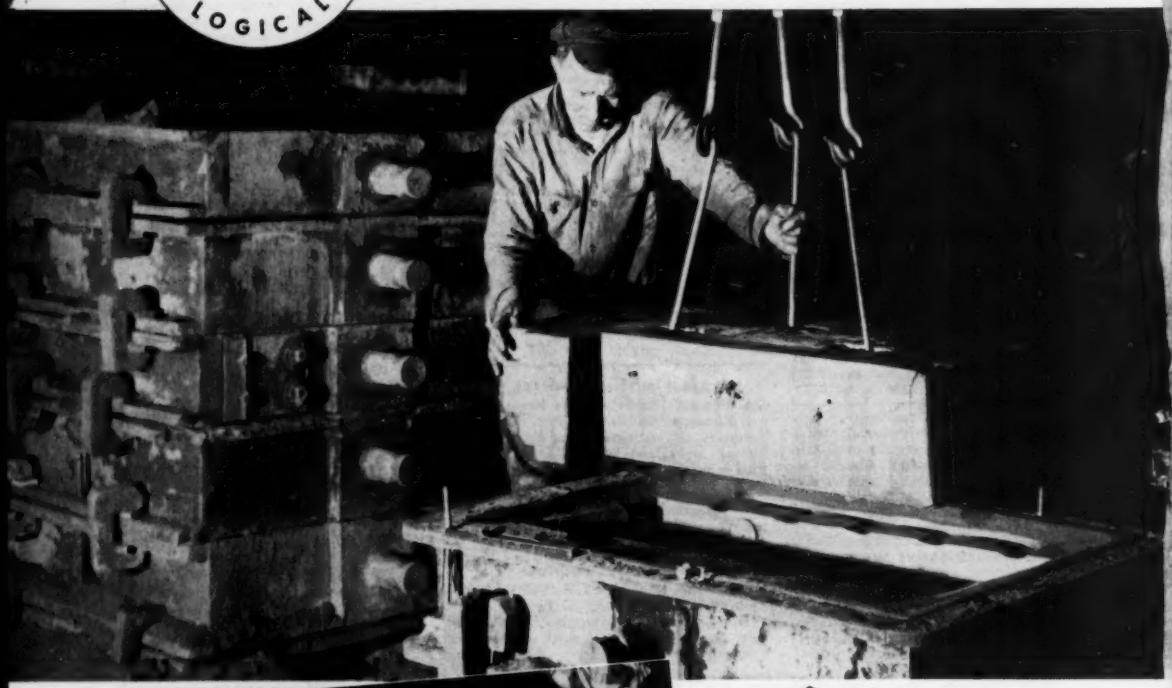
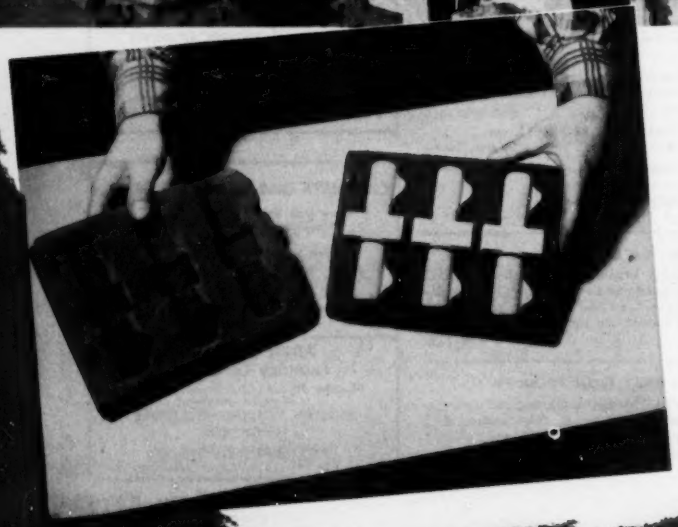
Including Shell Molding, etc.
P. O. Box 947 Aurora, Ill.

SACKS-BARLOW FOUNDRIES, Inc.

LINOIL USERS

THE LOGICAL OIL





In Sacks-Barlow Grey Iron Foundry, molder sets huge core for a casting to be used in a pigment grinding machine. Being a general jobbing foundry with relatively short runs of small to medium-sized castings, core control is of vital importance.

SAND DRYERS AFFECT LARGE SAVINGS in Newark Malleable Iron Works. In the casting of small parts . . . fittings, wrenches, handles, etc. . . . dryers made of sand and LINOIL can be used repeatedly without disintegration. Photo shows three valve cap cores in a sand dryer that has been through a 420°F. oven over 100 times.

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